QUEENSLAND GOVERNMENT

SUBMISSION TO THE INDUSTRY

COMMISSION BLACK COAL INQUIRY

PREPARED BY THE QUEENSLAND GOVERNMENT
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ABOUT THIS DOCUMENT

This document has been compiled by the Department of Mines and Energy on behalf of the Queensland Government. Contributions have been received from Queensland Treasury, Department of Premier and Cabinet, Department of Economic Development and Trade, Department of Training and Industrial Relations, Department of Transport, Department of Natural Resources and the Department of Environment.

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EXECUTIVE SUMMARY

The Queensland Government wishes to present a submission to this inquiry because of the significant impact of the coal mining industry on the State's economy. The submission responds to the Terms of Reference for the Inquiry by providing:

Background information on the present state of the industry in Queensland.
Information on work practices in Queensland coal mines, together with some international comparisons of productivity per employee.
Details of the operating environment in Queensland, including actions to reduce the cost of service inputs.
An outline of the health, safety and environmental management arrangements in the State.
A vision for the industry.

The submission does not contain detailed information on international benchmarking or on methods by which Australia's major competitors have implemented reform in their black coal mining industries. It is understood that studies commissioned by the Industry Commission for this inquiry will cover these topics with a more timely and relevant analysis than is presently available to the Queensland Government.

The black coal industry in Queensland

Coal Mining is critical to the Queensland economy. By way of background, the coal mining industry is Queensland's biggest mineral producer, producing $3.7 billion, or 61%, of the State's total mineral production. In addition:

The coal industry also contributed $4.6 billion (or 34%) of the State's export revenue.
The industry consists of 44 operating coal mines over 200 Mining Leases, 100 Exploration Permits and 75 Mineral Development Licences and is dominated by five major companies (BHP, QCT, Rio Tinto, ARCO and MIM).
On the production side the industry employs about 11,000 people, with a further 3,000 employed on the export transportation side.
The industry produced an all-time record of 99.43 million tonnes (Mt) of saleable coal during the financial year 1996/97, an increase of 6.05% over the previous financial year.
In 1996/97 exploration also reached record levels with over 38 Exploration Permit applications and exploration expenditure of over $47 million.
In 1996/97 the State collected about $168m in coal royalties, representing 64% of royalties collected.

Between 1987 and 1997 private company investment in coal mines and associated infrastructure totalled about $4 billion.

While these figures are impressive it is important to look at the future for the industry. Queensland has identified resources of over 35 billion tonnes of coal but this resource must be considered in terms of the coal type (coking and thermal) and the mining method of extraction. Such an examination reveals for instance that remaining in situ resources of high quality coking coal amenable to open cut extraction methods are only some 1900 million tonnes, and that resources of high volatile thermal coals amenable to open cut mining in the Bowen Basin amount to only 850 million tonnes.

Given that saleable coal tonnages are considerably less than in situ figures this points to a future operating environment characterised by traditionally higher cost underground extraction methods. In the face of continued downward pressure on world coal prices, this presents a threat to the future viability of the industry.

Productivity

Queensland Coal Board figures show that the level of production per employee increased from 6,401 tonnes p.a. in 1987/88 to 9,221 tonnes p.a. in 1996/97. This has been caused by improvements in technology and mining operations.

However, despite these improvements, there is a need to further improve the industry's productivity, particularly given the fact that it is facing a cost/price squeeze. Coal prices have been declining because of increased world supply. To date the industry has been able to remain competitive by reducing input costs. However, the industry is under pressure to reduce costs further and in this regard it is important that management and workers cooperate to increase productivity, particularly through improvements in work practices and a reduction in the relatively high level of industrial disputation in the industry.

Generally speaking, productivity comparisons of different mining operations should be treated with caution because of the need to compare similar mining operations eg comparing two open cut mines, not an open cut mine with an underground mine. To ensure a valid comparison it is necessary to compare like with like and it may be difficult to obtain comparable data for two or more mining operations.
An indicator of productivity, or an indicator of the use of labour and capital, is the time lost at Queensland coal mines due to industrial disputes, sickness, absenteeism and injuries. The statistics for 1996-97 show:

That there is a wide divergence between the best and worst performing coal mines in terms of time lost.

For opencut mines the time lost ranges from 1.52% to 14.92%, with an industry average of 4.97%.
For underground mines the time lost ranges from 2.05% to 15.96%, with an industry average of 8.67%.

It appears that there is potential for significant improvement in productivity for the worst performing mines if they reduced their down time. Even a reduction to the industry average should result in a significant improvement in productivity.

Operating environment

The Government has pursued a program of structural reform to enhance the competitiveness of all industries in the State. The key reform models utilised by the Queensland Government to achieve structural reform are:

Corporatisation (under the Government Owned Corporations Act); and
Commercialisation.

Key elements of structural reform are:

Removal of any responsibility for industry regulation from a public monopoly so as to prevent the monopolist enjoying any regulatory advantage;
Separation of natural monopoly elements from potentially competitive elements of the public monopoly;
Separation of the potentially competitive elements; and
Introduction of competitive neutrality measures.

These reforms are designed to increase the level of competition in the industry and to remove any potential for abuse of market power (for example, by way of monopoly pricing).

Corporatisation is a structural reform process which changed the conditions under which Government Owned Corporations (GOCs) operate. As far as practicable, the GOCs operate on a commercial basis in a competitive environment while allowing the Government, as owner, to continue to provide broad direction by setting key financial and non-financial performance targets and community service obligations.

With respect to the black coal industry, key input industries dominated in the past by government owned monopolies include: water, rail, electricity, gas and ports. However, each of these former monopolies is either currently undergoing or has been the subject of structural reform.

The Government believes that the changes introduced, in particular the expected further reduction in rail freight charges associated with competition for rail haulage, will lead to lower input costs for the coal industry, and hence increase its competitiveness.

The Queensland Government, via appropriate government agencies, plays a significant role in the facilitation of major projects such as new coal mines and their related infrastructure. Various agencies cooperate to: provide a whole of Government response on major projects where appropriate; identify relevant Government approvals and infrastructure requirements; assess and monitor Native Title claims; administer the mining tenures, native title and environmental regulatory processes. This approach provides proponents with an efficient and timely project assessment and approval process.

Environmental management of coal mines is required under the Mineral Resources Act 1989. The Environmental Protection Act (EPA) sets the performance requirements, generally based on national standards. The Act also imposes a general environmental duty on persons who are conducting an activity which may cause harm. Some industrial activities on mine sites require licensing under the EPA. The interaction between the two Acts is currently under review through a process that will develop an environmental protection policy for the whole mining industry.

Health and safety

The policy of the Queensland Government is that new health and safety legislation being prepared for both the coal and non-coal mining industry sectors is to be as consistent as practicable with the Workplace Health and Safety Act 1995, the principal workplace health and safety statute for all other industries in Queensland. This is a position consistent with the Industry Commission's proposals for industry specific OHS regimes (Industry Commission, 1995). The new approach is based on the principles of duty of care, onsite ownership of health and safety, and management systems to identify and control risk.

The adoption of an outcome focussed, performance based health and safety legislative regime for the coal mining industry offers significant advantages over the existing prescriptive approach. One of the most important benefits is the capacity to adopt existing national and State workplace health and safety standards applicable to hazards common across all industry including mining, such as standards for noise, hazardous substances, high risk plant and manual handling.

A vision for the industry

The Queensland Government sees the coal industry continuing to make a significant contribution to the Queensland economy. This will be achieved by an industry which supplies high quality product to an increasingly discriminating market at competitive prices. To achieve sustainability in this environment, management, labour and Government will work cooperatively to reduce input costs, to attain fair prices and to operate in accord with society's expectations with respect to economic return and environmental responsibilities.

In conclusion, the industry faces threats and in a future environment that looks increasingly competitive it is important that all parties involved in the coal mining industry cooperate to resolve differences and enhance the future prospects of the industry.

1. VISION FOR THE COAL INDUSTRY

The Queensland Government recognises the significant contribution that the coal mining industry makes to the State economy. The coal mining industry contributes to the standard of living and welfare of all Queenslanders and Australians.

The main threats to the industry appear to be:

- Persistence of restrictive work practices and a relatively high level of industrial disputation.
- The apparent inability of miners and management to agree on the best way forward so that all parties benefit.
- Competition from other sources of supply.
- The downward trend in coal prices due to supply exceeding demand.
- Rising costs of extraction to access deeper coal resources.
- The risks associated with greenhouse emission targets ie possible action by the international community which could have adverse implications for the industry, Queensland and Australia.
- Emergence of alternative competitive fuel sources.
- Possible increased costs in evironmental management and rehabilitation of disturbed lands.

There are also opportunities.

- If employee productivity can be improved through the elimination of restrictive workplace practices and a reduction in industrial disputation the industry is well placed as a low cost producer to continue to supply coal to new markets, particularly in Asia.
- Queensland has many coals which are relatively environmentally "clean" and so could be in demand overseas, notwithstanding greenhouse emission targets.
- Related to this, Queensland and Australian firms may be in a position to export technology to build relatively clean power stations.
- Cost reductions in rehabilitation may be achieved through research and development of alternate technologies and practices.

Accordingly, the Government wishes:

- To see the coal industry to continue making a significant contribution to the welfare of Queenslanders.
- The industry to continue to be internationally competitive, with high employee productivity, through improvements in workplace practices and a reduction in industrial disputation. This will require goodwill on the part of employers, employees and unions.
- To see a decline in work related accidents in coal mines.
- To see profitability levels increase.
- To maintain and increase Queensland's share of the world's seaborne coal market.
- To see any global emission standards which could adversely impact on the industry being phased in at a pace to minimise social dislocation.
- The industry to be sensitive to environmental issues and adopt best practice environmental management.
- To see the separation of the royalty regime from the rail freight regime by 2000, as planned under current policy.
- To see recognition of a culture of sustainable development by the coal producers, with respect to safety, health and the environment.

- To see the attainment by QR of world's best practice for export coal rail operations by 2000.
- To see continuing improvements in the coal transport chain.

2. CONCLUSIONS/RECOMMENDATIONS

The main **conclusions** of this analysis are that:

1. It appears that coal will remain a major part of the energy mix of Australia, Queensland and the rest of the world for at least one or two equipment generations of about 20 years.
2. The coal industry makes a significant contribution to the Australian and Queensland economies by virtue of its employment, output and exports.
3. Productivity comparisons need to be treated with caution, not only because of the different methods of calculation, but also because of the numerous variables in mining methods and operation. Some studies suggest that mine productivity in Australia appears to be high (second to the USA according to one source), but the Industry Commission will be better placed to see if Australian coal mine productivity is at or near world's best practice.
4. Queensland can produce premium coal products to command a price premium in world markets.
5. It appears that there is potential for significant improvement in productivity for the worst performing mines if they reduced their down time due to absenteeism, industrial unrest and injuries. Even a reduction to the industry average should result in a significant improvement in productivity.
6. There is a high level of industrial unrest in the industry despite the relatively high levels of remuneration to workers.
7. The industry is facing threats from rising costs to access and extract deeper coal resources, new international competitors, collapse of Asian monetary economies and possible global targets to reduce greenhouse emissions.
8. However, there are also opportunities to the Queensland industry if it remains internationally competitive and continues to seek out new markets.
9. To contribute to the international competitiveness of the black coal industry the Queensland Government has introduced reforms to the rail and port operating systems in the State which are intended to reduce the cost of services they provide to the coal industry.
10. The Queensland Government is prepared to encourage and facilitate new investment in the coal industry.
11. There is a need to develop a comprehensive incident and injury reporting system that can link in with interstate issues and developments. The need is increasing for services in the analysis and dissemination of health, injury and incident data for risk analysis purposes.
12. With the change to a "duty of care" approach in the *Coal Mining Act*, companies and employees need to develop commitment to long term improvements in health and safety, in an environment of increasing productivity.
13. With the General Environmental Duty applied through the Environmental Protection Act, companies need to adopt all reasonable and practicable measures to prevent or minimise environmental harm and conform to relevant environmental protection policies.

Following from the above, the Queensland Government **recommends** that:

1. The coal industry be allowed to prosper in an environment conducive to growth.

2. Employers, employees and unions need to work more closely together to increase productivity of the industry and to increase coal exports.

3. The risks to the coal industry associated with global greenhouse emission controls be recognised, and strategies developed to minimise the impact of domestic moves to abate emissions and to capitalise on opportunities to increase exports through promotion of Australia's clean coal technologies.

4. If global controls on greenhouse gasses are adopted, they should be set at a level that will minimise social and economic dislocation within Australia and ensure that the burden of meeting emission reductions is shared equally between nations. In this regard the Queensland Government supports the Commonwealth Government's position on differentiation.

3.0 INTRODUCTION

The black coal industry dominates Australian mineral exports. In Queensland the coal industry is the State's dominant export earner, and a viable developing industry is critical to the economic growth of the State. While coal has always been an important fuel source for Queensland, the industry has grown rapidly from a small domestic industry to be the dominant player in the world seaborne coal market. This growth has been based around the coking coal export mines in the Bowen Basin which began production in the late 1960s and early 1970s. However the development of an export thermal coal market has meant the expansion over the last 10 years of Queensland thermal coal production to a point where it contributes a third of the State's coal exports.

The industry is facing challenges to its long term viability in a number of areas:

- Having to access deeper coal resources as the shallow reserves of the current open cut pits are mined out.
- Industrial unrest largely revolving around productivity and work practices.
- The global concern in relation to greenhouse gas emissions.
- Concern over environmental performance and liability.
- Real reduction in prices over time.
- Competition from other sources of supply and other fuel sources.

It is this context that this submission from the Queensland Government to the Industry Commission inquiry into various aspects of the operations of the black coal industry in Australia has been framed. The Queensland Government is pleased to be able to respond to the Industry Commission and has done so in terms of the Commonwealth Government's Terms of Reference for the inquiry. The submission has focussed on areas where the Government has expertise and believes it is well placed to provide information and comment. These areas include: 3(b) cost components and 3(c) safety in mines. Comments have been made to a lesser degree on the other areas of the Terms of Reference.

As well as addressing the Terms of Reference, this submission provides considerable background information on the operation of the industry in Queensland which should provide some perspective to the Commission's inquiry. This material includes an overview of the coal industry to date, including data on production and exports and prices over the last 10 years; and comments on the future, including potential projects and a look at the coal market and coal prices. Considerable detail is then provided on the factors affecting competitiveness in the coal industry including, the transport system, royalty regime and health and safety issues. The role of government and its impact on the industry is then addressed in detail, including examining the corporatisation, competition and industry policies of government, and government's role in regulation and facilitation. The environmental issues affecting the industry are also examined.

The submission also provides a vision of the future for the industry and relevant recommendations and conclusions.

4.0 THE COAL INDUSTRY IN QUEENSLAND

4.1 PRESENT STATUS

4.1.1 Coal quality and resources

Queensland has abundant coal resources which have been identified in a number of basins throughout the State. There are 44 operating coal mines in the State and a further approximately 90 identified deposits of proven coal resources (see Figures 1 and 2).

The Queensland Department of Mines and Energy assessment of coal resources in 1997 has determined that some 35,712 million tonnes (Mt) of resources are identified to measured/indicated status. This figure represents the tonnage of raw coal in situ. Figures are reported on a deposit by deposit basis and a summary of these on a basin by basin basis is provided below (Table 1).

The amount of saleable product coal available will be substantially less due to losses which will occur through geological conditions which may limit extraction and mining and beneficiation losses. Nominal limits of 60 metres of overburden for opencut resources and a 1.5 metres minimum seam thickness for all resources normally apply.

TABLE 1: SUMMARY OF QUEENSLAND COAL RESOURCES
(million tonnes*)

Period/Basin	Coking Coal						Thermal Coal						Total
	Opencut			Underground			Opencut			Underground			
	M	I	M+I	M	I	M+I	M	I	M+I	M	I	M+I	
PERMIAN													
Bowen	2119	504	2623	5149	5617	10766	2438	693	3131	2256	6678	8934	25454
Galilee	-	-	-	-	-	-	1267	951	2218	530	-	530	2748
subtotal	**2119**	**504**	**2623**	**5149**	**5617**	**10766**	**3705**	**1644**	**5349**	**2786**	**6678**	**9464**	**28202**
MESOZOIC													
Callide	-	-	-	-	-	-	474	192	666	172	23	195	861
Ipswich	-	-	-	-	-	-	1	3	4	484	84	568	572
Laura	-	-	-	-	45	45	-	-	-	-	-	-	45
Moreton	-	-	-	-	-	-	1500	1011	2511	6	-	6	2517
Mulgildie	-	-	-	-	-	-	55	55	110	-	-	-	110
Styx	-	-	-	-	-	-	-	-	-	4	-	4	4
Surat	-	-	-	-	-	-	1124	1584	2708	-	-	-	2708
Tarong	-	-	-	-	-	-	546	147	692	-	-	-	692
subtotal	**-**	**-**	**-**	**-**	**45**	**45**	**3700**	**2992**	**6692**	**666**	**107**	**773**	**7510**
TOTAL QLD	**2119**	**504**	**2623**	**5149**	**5662**	**10811**	**7405**	**4636**	**12041**	**3452**	**6785**	**10237**	**35712**

* Tonnages rounded to nearest million.**M** = Measure category, **I** = Indicated category.

The State's resources consist of some 23.36 billion tonnes that are primarily suitable for utilisation as thermal and PCI coals and 12.35 billion tonnes that are primarily metallurgical coking coals. While the total figure of 35.7 billion tonnes is large, it should be noted that the amount of both coking and thermal coal amenable to open cut mining in Queensland's premier coal mining region the Bowen Basin, represent only 16% of the total.

It is worth examining the breakdown of the total resources according to the type of coal. Table 2 shows subdivisions of the resources by various categories according to the expected product volatile matter content (adb). Coals with little or no present export potential have been classified separately into a single class and included in this group are resources of the Galilee, Callide and Tarong Basins. The data is also presented graphically in Figures 3 and 4 below.

The division between coking and non-coking coals is placed at a Crucible Swelling number of 4 for the raw coal. However, many coals categorised as non-coking can be washed to produce a coking fraction while some coals designated as coking are currently being marketed as non-coking coals. Ultimately market demands will determine the actual end use of these coals.

TABLE 2: QUEENSLAND COAL RESOURCES 1997
(by product volatile matter types)

Class		**Tonnage**		
(air-dried basis)		**Opencut**	**U/G**	**Totals**
THERMAL AND PCI COALS				
VM >30 & HGI <40		5329	6	**5335**
VM >30 & HGI >40		857	1995	**2852**
VM 25% - 30%		1256	4858	**6114**
VM 20% - 25%		453	870	**1323**
VM <20%		850	2585	**3435**
Non-Export (Galilee Basin, Callide etc)		3576	725	**4301**
	Totals: (Thermal & PCI)	**12321**	**11039**	**23360**
COKING COALS				
VM >30%		47	631	**678**
VM 26% - 30%		245	2625	**2870**
VM 20% - 26%		1600	6314	**7914**
VM<20%		451	439	**890**
	Totals: (Coking)	**2343**	**10009**	**12352**
ALL COAL RESOURCES:	**GRAND TOTALS**	**14664**	**21048**	**35712**

Further details on Queensland's coal resources are set out in Appendix II.

FIGURE 1: FULL PAGE

FIGURE 2: FULL PAGE

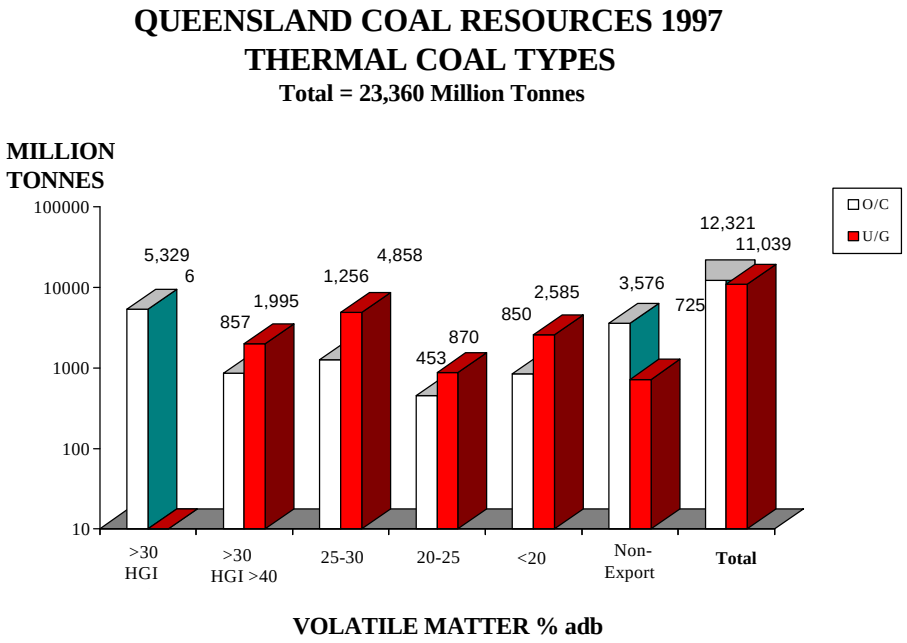


Figure 3: Queensland thermal coal resources 1997.

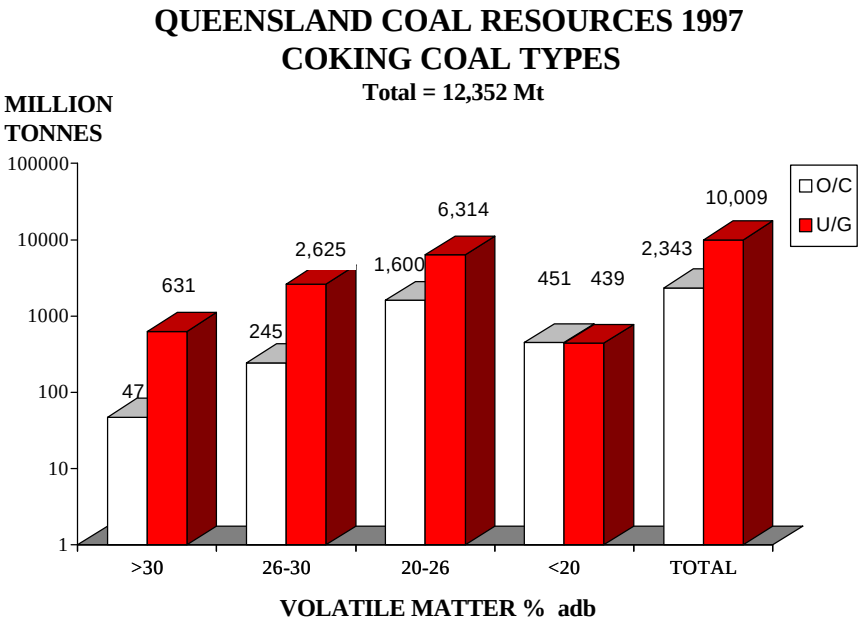


Figure 4: Queensland coking coal resources 1997.

4.1.2 Production

Production of saleable coal in 1996/97 increased to almost 100Mt, which in turn represented an increase of 6.1% on the previous year. Over the period from 1987/88 to 1996/97 production has increased on average by 4.7% p.a. with only one year (1995/96) reflecting a small decrease on the prior year's production.

Whilst production of both categories of coal (coking and thermal) has increased over the years, the main growth since 1990/91 in both absolute and percentage terms has been with thermal coal, with compound growth of 5.7% p.a., approximately double that of coking coal.

Production increases have arisen as a result of expansions at existing mines as well as the development of new coal mines in recent years.

TABLE 3: COAL PRODUCTION - VOLUME

Table	Production of Saleable Coal - '000 Tonnes									
Coal Type	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97
Coking coal	N/A	N/A	N/A	44,907	48,495	47,870	46,945	51,006	48,520	52,894
Thermal coal	N/A	N/A	N/A	33,456	35,590	37,431	38,794	43,490	45,243	46,543
Total	65,819	74,118	74,931	78,363	84,085	85,301	85,739	94,496	93,763	99,437
Annual increase		12.6%	1.1%	4.6%	7.3%	1.4%	0.5%	10.2%	-0.8%	6.1%
Compound growth										4.7%
Source										
Queensland Coal Board - Queensland Coal Industry Review										

In terms of **value of production** coal has represented over 60% of total mineral production value over the past several years, showing an average annual growth of 7% p.a (see Appendix III).

TABLE 4: COAL PRODUCTION - VALUE

Table	Value of Production - $m									
Category	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97
Coal	2,142	2,381	2,879	2,950	3,257	3,555	3,317	3,339	3,688	N/A
Other	1,764	2,003	2,227	2,103	1,825	2,069	1,953	2,094	2,366	N/A
Total	3,906	4,384	5,106	5,053	5,082	5,624	5,270	5,433	6,054	N/A
% of Total	54.8%	54.3%	56.4%	58.4%	64.1%	63.2%	62.9%	61.5%	60.9%	
Source										
Department of Mines and Energy - Mineral Production Statistics										
N/A - Not available										

4.1.3 Exports

The major portion of coal produced in Queensland, therefore, is destined for overseas markets with the relevant percentages for 1996/97 being export (81.0%), Queensland (18.6%) and interstate (0.4%).

While Queensland's total production is dwarfed by countries such as USA, China and India, Queensland is the largest coal exporting province in the world.

TABLE 5: COAL MARKETS

Table	Distribution of Saleable Coal - '000 Tonnes									
Destination	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97
State	12,180	13,006	13,575	13,874	14,889	14,925	15,832	16,815	17,652	18,109
Interstate	777	1,071	530	320	363	484	204	490	257	420
Export	58,422	59,027	61,269	61,918	69,656	71,044	71,438	77,601	76,031	78,970
Total	71,379	73,104	75,374	76,112	84,908	86,453	87,474	94,906	93,940	97,499
Annual increase		2.4%	3.1%	1.0%	11.6%	1.8%	1.2%	8.5%	-1.0%	3.8%
Compound growth										3.5%

Source
Queensland Coal Board - Queensland Coal Industry Review

TABLE 6: COAL EXPORTS - VOLUME

Table	Destination of Export Saleable Coal - '000 Tonnes									
Region	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97
Japan	25,763	28,730	30,154	30,086	31,028	32,076	29,549	30,865	29,743	30,150
Europe	15,254	12,222	13,685	12,676	16,044	14,601	14,788	16,382	14,763	15,302
Asia	11,764	13,860	13,774	14,237	16,287	17,616	19,909	22,651	23,926	26,209
Others	5,641	4,215	3,656	4,919	6,297	6,751	7,192	7,703	7,599	7,309
Total	58,422	59,027	61,269	61,918	69,656	71,044	71,438	77,601	76,031	78,970
Japan	44.1%	48.7%	49.2%	48.6%	44.5%	45.1%	41.4%	39.8%	39.1%	38.2%
Europe	26.1%	20.7%	22.3%	20.5%	23.0%	20.6%	20.7%	21.1%	19.4%	19.4%
Asia	20.1%	23.5%	22.5%	23.0%	23.4%	24.8%	27.9%	29.2%	31.5%	33.2%
Others	9.7%	7.1%	6.0%	7.9%	9.0%	9.5%	10.1%	9.9%	10.0%	9.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source
Queensland Coal Board - Queensland Coal Industry Review

However, there has been a notable shift in the destination of export markets over the past several years. Whilst Japan and Europe accounted for over 70% of export coal in 1987/88, this has declined to below 58% in 1996/97. Correspondingly, the proportion of exports to other Asian nations has increased by some 14.5Mt over the period, such that it now accounts for one third of all Queensland coal exports.

In terms of **value of exports**, Queensland coal represents approximately one third of the State's exported product and about 6% of the total of the nation's exports. When viewed from this perspective one can readily appreciate the significance of the Queensland coal industry's contribution to the Queensland and Australian economy.

TABLE 7: COAL EXPORTS - VALUE

Table	Value of Exports - $m									
Coal Type	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97
Coking	2,127	2,150	2,499	2,582	2,813	3,254	3,070	3,027	3,274	3,440
Thermal	765	786	1,001	1,045	1,191	1,090	1,078	1,098	1,162	1,120
Total	2,892	2,936	3,500	3,627	4,004	4,344	4,148	4,125	4,436	4,560
Total Qld Exports	8,167	9,089	10,466	10,728	10,865	11,798	11,984	12,511	13,612	13,554
Total Aust. Exports	40,721	44,007	49,078	52,399	55,027	60,702	64,548	67,052	76,004	78,885
% of Queensland	35.4%	32.3%	33.4%	33.8%	36.9%	36.8%	34.6%	33.0%	32.6%	33.6%
% of Australia	7.1%	6.7%	7.1%	6.9%	7.3%	7.2%	6.4%	6.2%	5.8%	5.8%

Source

Queensland Coal Board - Queensland Coal Industry Review

ABS Queensland Year Book

Queensland Government Statistician's Office

ABS Catalogue No. 5422.0

4.1.4 Price trends

However, whilst production and export values have increased in absolute terms, the average $A price received by Queensland coal producers has been in decline over the past several years, resulting in relatively little change in the real value of coal exports.

TABLE 8: COAL EXPORT PRICES - AUSTRALIA

	Average Export Price (FOB) Per Tonne - $A													
	1967-68	1972-73	1977-78	1982-83	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97
Actual Price ($/t) (a)	8.21	11.28	39.14	56.21	46.61	47.90	55.69	55.98	55.34	58.28	55.49	50.45	56.03	53.94
CPI (b)	16.3	20.4	37.9	60.8	86.2	92.6	100.0	105.3	107.3	108.4	110.3	113.9	118.7	120.3
CPI Adjusted Price - 1996-97 $	60.59	66.52	124.24	111.22	65.05	62.23	67.00	63.95	62.04	64.68	60.52	53.28	56.78	53.94

Notes:

(a) Average export unit value. *Source*: (1967-68 to 1994-95) ABARE *Australian Commodity Statistics 1996* and (1995-96 and 1996-97) ABARE *Australian Commodities: Forecasts and Issues*, June Quarter 1997.

(b) Eight Capital Cities: All groups. Source: ABS Cat. No. 6401.0

TABLE 9: COAL EXPORT PRICES - QUEENSLAND

Table	Average Export Price (FOB) Per Tonne - $A									
Coal Type	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97
Actual Price										
Coking	54.02	53.57	61.90	63.25	62.71	66.64	63.50	57.86	62.90	62.83
Thermal	40.17	41.59	47.88	49.52	48.05	49.08	46.66	43.45	48.48	46.24
All coals	49.50	49.74	57.12	58.57	57.49	61.15	58.06	53.16	58.36	57.74
CPI Index	86.2	92.6	100.0	105.3	107.3	108.4	110.4	113.9	118.7	120.3
Year 1989/90 = 100.0										
CPI Adjusted Price - 1996/97 $										
Coking	75.39	69.59	74.47	72.26	70.31	73.96	69.19	61.11	63.75	62.83
Thermal	56.06	54.03	57.60	56.57	53.87	54.47	50.84	45.89	49.13	46.24
All coals	69.08	64.62	68.72	66.91	64.46	67.86	63.27	56.15	59.15	57.74
Source										
Queensland Coal Board - Queensland Coal Industry Review										
ABS Catalogue No. 6401										

TABLE 10 : VALUE OF EXPORTS IN REAL TERMS

Table	Value of Exports - $A Real									
Coal Type	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97
Exports - Nominal	2,892	2,936	3,500	3,627	4,004	4,344	4,148	4,125	4,436	4,560
CPI Index	86.2	92.6	100.0	105.3	107.3	108.4	110.4	113.9	118.7	120.3
Year 1989/90 = 100										
Exports - Real	4,036	3,814	4,211	4,144	4,489	4,821	4,520	4,357	4,496	4,560
1996/97 $										
Source										
Queensland Coal Board - Queensland Coal Industry Review										
ABS Catalogue No. 6401										

Table 8 above shows that between 1967/68 and 1996/97 the real price of all Australian coal exports declined from $60.59 to $53.94, a fall of about 11%. The table shows that prices peaked in 1977/78 and declined thereafter. Between 1987/88 and 1996/97 there was a real price decline of about 17%.

Table 9 above shows that:

- In real terms the price of all coals in $A declined by 16.4% between 1987/88 and 1996/97.
- Steaming coal prices fell by 17.5% in real terms over this period.
- AME Mineral Economics (AME Mineral Economics, Export Coal 1997, page xxi) estimates that in $US/tonne FOB there was no change in the real price of coal between 1987 and 1996. However, AME Mineral Economics estimates that between 1982 and 1996 real steaming coal prices declined by about 41% in $US/tonne FOB terms.
- Coking coal prices have declined in real terms between 1987/88 and 1996/97 but there has been an arrest in the decline in the last three years.

All three series of export prices appear to be showing a broadly similar trend. Namely, a gradual fall in prices since 1967/68, with a peak in the late 1970s and early 1980s.

Generally speaking, world coal prices are set by the supply and demand for coal. Another important factor on the supply side has been the significant decline in the production costs in the Australian industry. The combination of declining production costs and the emergence of new low cost sources of supply such as Indonesia and Colombia has resulted in a fall in real coal prices in international markets.

4.1.5 Investment in new mines and associated infrastructure

Private company investment in mines and associated infrastructure between 1987 and 1997 totalled about $3.8 billion and included the development of new mines such as Ensham, Gordonstone, North Goonyella, Crinum, Wilkie Creek, Burton, Kenmare and South Walker Creek, as well as Moranbah North which is still under construction.

In addition to this expenditure Queensland Rail has expended about $550m on infrastructure for coal haulage during the past 5 years.

Expenditure by Queensland's Port Authorities in expanding total coal export port capacity over the last 10 years is in the order of $500 million.

Further investment in coal transport infrastructure by both the public and private sectors has already been committed.

4.1.6 Employment

The coal mining industry in Queensland has consistently employed between 10,000 and 11,000 employees since 1987/88.

TABLE 11: EMPLOYMENT AND PRODUCTIVITY

Table	Average Number of Employees During Year									
Mining Type	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97
Opencut	8,836	9,226	8,586	8,924	8,903	8,808	8,607	8,354	8,469	8,396
Underground	1,447	1,395	1,576	1,707	1,964	1,880	1,988	1,976	2,297	2,388
Total	10,283	10,621	10,162	10,631	10,867	10,688	10,595	10,330	10,766	10,784
Production ('000 Tonnes)	65,819	74,118	74,931	78,363	84,085	85,301	85,739	94,496	93,763	99,437
Per Employee	6,401	6,978	7,374	7,371	7,738	7,981	8,092	9,148	8,709	9,221

Source
Queensland Coal Board - Queensland Coal Industry Review

An additional 3,000 people are employed in the provision of coal export transport services from the mines to vessels.

4.1.7 Revenue

As part of the considerable benefits of the coal industry to the Queensland economy from an economic perspective, the contribution to State revenue is also significant. The contribution from rail freights has been well documented in the past and is dealt with separately. However, the contribution from royalties was $168m in 1996/97 with further increases forecast over the next few years. This in part is due to a change in royalty regime introduced in 1994. The contribution of coal royalty to total royalty has averaged over 60% in the past four years, which correlates closely with the contribution to total production value from coal.

Details of the additional Commonwealth and State taxes (eg payroll tax) paid by the coal mining industry are set out in section 6.5.

TABLE 12: ROYALTY REVENUE

Table	Royalty Revenue - $m									
Mining Type	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97
Coal royalty	98	85	107	116	126	145	141	133	163	168
Other royalty	97	92	100	110	91	106	96	93	100	95
Total	195	177	207	226	217	251	238	226	263	263
Coal % total	50.2%	48.2%	51.8%	51.4%	58.0%	57.7%	59.5%	58.7%	62.1%	64.0%
Coal value	2,142	2,381	2,879	2,950	3,257	3,555	3,317	3,339	3,688	N/A
Average royalty %	4.6%	3.6%	3.7%	3.9%	3.9%	4.1%	4.3%	4.0%	4.4%	N/A

Note

On an annual basis the average royalty % can be distorted slightly due to timing differences in collection and the extent of stockpile variations from year to year. However, the gradual increase over the past few years reflects the effects of the change in coal royalty arrangements from January 1994.

Source

Department of Mines and Energy - Royalty & Mineral Production Statistics

N/A - Not available

4.1.8 Industry structure

General

The Queensland coal industry is dominated by BHP. It holds equity interests in 10 mines which produced 40.8Mt of the 99.4Mt of saleable coal in the State in 1996-97. BHP is also the operator for those mines. Tonnage attributed to BHP, based on its equity interest in each mine, was 22.4Mt.

The next largest producers based on equity interests are QCT Resources Limited (11.9Mt), Rio Tinto Limited (11.3Mt), ARCO Coal Australia Inc. (9.8Mt) and MIM Holdings Limited (8.3Mt). These are followed by Shell Coal Pty Ltd (5.4Mt), AMP Society (4.8Mt), Mitsubishi Development Pty Ltd (4.2Mt) and Idemitsu Kosan Co Ltd (3.3Mt).

Assuming BHP, QCT, MIM and AMP are essentially Australian owned, then Australian owned equity tonnage (including smaller producers) totalled 56Mt, ie 56% of total production.

Equity tonnage attributable to Japanese companies totalled 16Mt, ie 16%; the major players being Mitsubishi Development, Idemitsu Kosan, Mitsui, Sumitomo and Itochu. As well as being major buyers of Queensland coal, all of these companies have varying degrees of equity in Queensland coal mines. There would be several factors for this vertical integration, but presumably security of supply concerns would be a significant one.

Equity tonnage attributable to other foreign owned companies including Rio Tinto, ARCO and Shell total 27.5Mt, ie 27.5% of total production.

Exploration and development is currently dominated by five major companies or consortia - BHP Coal Pty Ltd, Rio Tinto and the Shell Company of Australia. However, at the present time there are more than 60 companies (including subsidiaries) actively exploring or operating mines plus approximately 45 additional companies who are non active investors in the coal exploration or mining industry in Queensland.

Vertical and horizontal "integration"

Elements of vertical and horizontal "integration" within the transport chain for Queensland coal is present with both the public and private sectors providing infrastructure and services to various links in the transport chain .

The public sector is involved in the provision of all the existing railway links and sections of the ports system. Provision also exists for private sector involvement in the rail industry.

Depending upon which transport path is taken the level of public sector involvement can extend from the ownership and operation of the railway, the ownership and operation of the terminal and the operation of some port and harbour services, eg. channel, pilotage and navigational aids.

Alternatively in the case of coal shipped by rail to a private coal terminal the level of public sector involvement is the ownership and operation of the railway and the provision of some harbour services.

The private sector is involved in the ownership and operation of all coal mines, certain coal terminals, towage and sometimes shipping. In addition, cases exist where a mine owner has a level of involvement a number of coal terminals.

By way of example, BHP is associated with a number of coal mines which supply coal to the Hay Point Services and Barney Point Terminals. The company has an association with the ownership and operation of both of these terminals. The company is also involved in the operation of a fleet of bulk cargo vessels. The facilities required to unload the tippler wagons operated on the Goonyella system exist only at the Hay Point Services Terminal.

Mount Isa Mines (MIM) is associated with coal mines supplying the Abbot Point Terminal and also with the terminal's operations.

The operator of the Dalrymple Bay Coal Terminal, is a private company which is owned by the consortium of mines which use the terminal for export. This consortium includes BHP and MIM.

The coal transport chain in Queensland exhibits a network of transport links that are owned and/or managed by a variety of public and private sector entities. It involves a level of vertical and

horizontal integration between the links resulting in complex commercial relationships. It can be distinguished from a single owner/operator mining and transport operation which often exists in metalliferous mining operations.

4.2 FUTURE PROSPECTS

4.2.1 Demand outlook and future developments

A survey of world seaborne coal trade forecasts by groups including Barlow Jonker, ABARE, International Coal Report, BHP Coal - World Outlook and AME Mineral Economics show forecasts ranging from 447 to 488Mt in 1998, expanding to between 495 and 540Mt in year 2000. A few have extended their forecasts to year 2005 where they predict seaborne coal trade could range between 545 and 595Mt.

Queensland's share is forecast to increase from 79Mt in 1996-97 to 85Mt in 1998, and then to 95Mt in year 2000.

Tempering these predictions is the fact that supplies of thermal coal have been more than adequate to meet the short term rise in demand and this has resulted in a drop in thermal coal prices in the last financial year. Analysts are still predicting high demand from 2001 and beyond but that the market for coal supply will be highly competitive as many countries gear up to meet the anticipated demand. Countries such as Colombia and Indonesia are and will continue to increase production significantly. Projects such as the new gas resource at Tannggguh offshore from Irian Jaya will also put pressure on coal as a fuel source in Asia.

In addition lower growth rates may now occur in East Asia following currency and equity market collapses in Southeast Asia, which could also reduce thermal coal demand rates. A number of greenfields projects previously being likely for short term development may be delayed.

Steel makers around the world have been adopting pulverised coal injection (PCI)* as a technique to lower their consumption of coking coal. The ideal PCI coal has a high carbon content, low volatile content and high calorific value. About 25 percent of the identified thermal coal resources of the Bowen Basin is of a low-volatile nature, potentially saleable on the PCI market. Explorers have recognised that many of the undeveloped coal resources in the northern and central Bowen Basin have these qualities. This has sparked renewed exploration for hitherto unmarketable coal which has already been located in many places during past exploration for higher value coking coal deposits.

Exploration

Coal exploration also reached record levels during 1996-97, surpassing the high levels achieved over the previous three years. The record levels of exploration were achieved even though the Wik decision of December 1996 necessitated a freeze until June 1997 on the grant and renewal of exploration permits and mineral development licences over land which was not freehold. After that time the Department adopted work procedures for assessing the likelihood of Native Title and has been progressing limited numbers of tenure actions.

In 1996-97 the number of Exploration Permit for Coal (EPC) applications received (38) was the highest ever and significantly more than the 25 in 1995-96 (Figure 6). However the actual number of EPCs granted in 1996-97 (15) dropped from 1995-96 (21) due to the impacts of the Wik decision. The increase in coal exploration expenditure between 1994-95 and 1995-96 was again

significantly exceeded during 1996-97, amounting to $47.3 million (Figure 5 - Australian Bureau of Statistics figures).

A number of companies are continuing to undertake intensive exploration programs over known deposits, with a view to progressing development to the mining stage in the near future. The majority of applications has been from smaller explorers, who continue to investigate less well-known areas, typically targeting small resource areas suitable for open-cut mining and close to existing infrastructure. Much of this exploration has been in the north and central Bowen Basin and has resulted in delineation of several small thermal / Pulverised Coal Injection (PCI) coal deposits and a major deposit of coal at Coppabella, near Nebo. It is note worthy that of the 38 applications for EPCs in 1996/97, 29 had thermal coal (include PCI) as the main target.

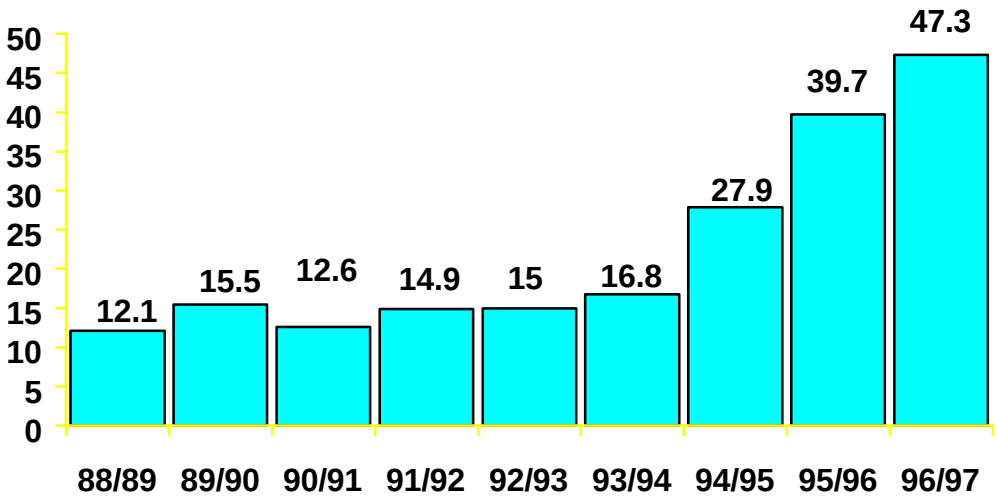


Figure 5. Expenditure on coal exploration

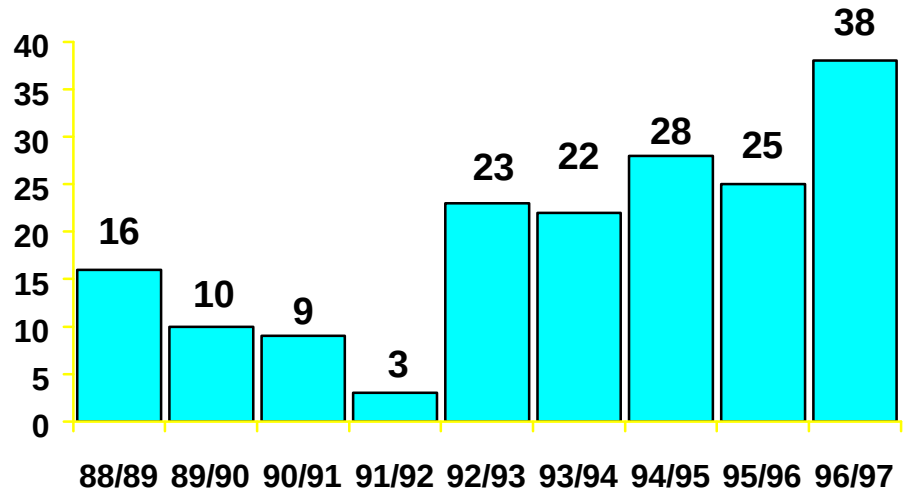


Figure 6. Number of Exploration Permit for Coal applications

Mine prospects

To meet any increased demand there are 15 potential new coal projects and expansions in Queensland on which feasibility studies are currently being undertaken (see Appendix IV). The combined value of these projects involves investment of over $4b, additional production of 50Mt and additional exports of about $2b.

MIM and Entergy Corporation announced on 20 October 1997 an agreement aimed at building a 700 megawatt power station and a 3Mtpa coal mine at Wandoan in the Surat Basin. Construction is planned to begin in late 1998, with the project to come on stream in late 2001.

4.2.2 The international coal market

The international coal markets may be categorised by the designated use of the coal, eg. coking coal or thermal coal, or by geographic destination such as Japan, Europe, etc.

The internationally traded seaborne coal markets have been characterised by a number of 'benchmark' prices struck each year between major buyers and sellers. The most significant prices are those determined in annual negotiations with the Japanese steel mills (JSM) for coking coals and the Japanese power utilities (JPU) for thermal coals. These prices flow through to other major markets such as Korea and Taiwan and are highly influential in determining coal prices elsewhere in the world.

In practice the JSM price for hard coking and other metallurgical coals has been set by negotiation between Nippon Steel Corporation as lead negotiator for the JSM and BHP Coal (BHP is the world's largest coal exporter); some other coal producers question whether BHP settles for less attractive prices in return for increased tonnages.

For thermal coal price negotiations, the Chubu Electric Power Company is the lead negotiator for the JPU while the principal suppliers are represented by a consortium of Australian companies. In the last year there has been some erosion of the Japanese benchmark pricing system through spot

market purchases with direct deals between suppliers and consumers involving competitive tendering. Some sales were reportedly made at prices discounted by up to US$10 per tonne.

There is a tendency for purchasers to find problems with coal quality to detract from the established benchmark price, but rarely do the producers obtain any premium for enhanced qualities. Coking coals have been assigned to various categories eg. hard coking, soft coking etc. In the middle 1980s a new category of semi-soft coking was introduced and some soft coking coals were down graded into this class with corresponding price cuts.

More recently with the wider introduction of PCI technology hard coking coals of high CSR** are preferred. Again the Japanese buyers used this parameter to down grade certain hard coking coals rather than face a premium price for the most desired coals. A new "fair pricing system" was introduced by the Japanese steel mills to price a coal more on its relative performance (eg according to its CSR value) to other coals. However, this system has not necessarily delivered markedly higher prices for the premium coking coals. The major suppliers of premium grade coking coals of high CSR in Queensland are BHP and Shell.

* PCI = pulverised coal injection [for blast furnaces]
** CSR= coke strength after reaction

Demand for "clean" Queensland thermal coals could be widened by encouraging the installation in new power stations of boilers with appropriate design enabling acceptance of a broader range of feed coals.

It has been argued that the international marketplace is made up of Australian producers who act as free and independent agents bargaining with government sanctioned organisations of buyers, for example, the JSM in Japan and the Association of German Coal Importers (or VDKI) in Europe. It is also noted that Asian consumers, particularly Japanese companies, take equity positions in Queensland coal mines; thus the coal purchasers have access to information on production costs, etc, and while this may ensure that prices are sufficient for continuing supply of product, there is most likely not going to be any windfall profits.

The development of new export thermal coal mines particularly in Indonesia and Colombia is being driven by the same multi-national companies that have large coal mining interests in Australia eg. BHP, Rio Tinto, Shell. It appears that provided a certain minimum return can be made, these companies are quite prepared to shift production around the world to fit their corporate agenda. They readily sacrifice price in return for volume of sales and achieve supposedly higher overall profits through the larger volume.

Historically, many concessions given by the Australian Federal and State Governments to reduce charges have been passed on to consumers in the form of lower coal prices to compete with these overseas operations.

The most recent larger coal mines, built in Indonesia and present expansions and developments in Colombia by the multi-nationals are of very high capacity (>10 million tonnes per annum) in keeping with the economies of scale strategy. This has led to maintaining surplus world capacity because there have not been mine closures to compensate. In addition, the Japanese buyers are prepared to pay higher prices to some to ensure that the market remains in oversupply.

4.2.3 Future coal prices

AME Mineral Economics (AME Mineral Economics, Export Coal 1997, page xxi) expects coking and steaming coal prices to decline significantly in real terms between 1996 and 2006 (steaming coal prices are forecast to decline by about 26% in real terms).

- It forecasts that 25 new mines will be required worldwide by 2006, of which 19 will be in Australia. This is expected to add significantly to the supply of coal.

The Queensland Government agrees that at the moment it appears that prices will continue to decline but it is unclear by how much.

- As a general trend, thermal coal prices are anticipated to continue to fall in real terms over the next several years. This trend is shared by most other commodities (ie gold) and is driven by a combination of excess supply capacity worldwide and by continuing reductions in real production costs that are being passed on to the buyers to maintain market share.

- Cost savings made through technological improvements, enhanced management and better planning will thus translate to maintaining or improving world market share rather than improved profit margins. Any improvement in margins would likely trigger additional capacity being brought on line until the current cost\price balance has been restored.

Increases in coking coal prices (and thus profit margins) over the last three years has triggered additional capacity being brought on line globally. This is now likely to cause some fall in prices and profit margins. This may be partly offset by the probable closure of a number of marginal hard coking coal mines in Canada in the next couple of years. (The current expansion plans by BHP at Peak Downs and Saraji are planned to take advantage of these closures.)

However, it should be noted that price declines are not necessarily indicative of an ongoing decrease in industry profitability. This will only occur if reductions in real production costs do not keep pace with the price declines.

What this means is that to remain economic and competitive, the Queensland coal mining industry will have to increase productivity levels at a rate equal to, or better than, the world average to maintain or improve current market share.

4.2.4 Coal as a future energy source

In the State Strategic Plan, the Queensland Government committed itself to ensuring adequate and cost effective infrastructure services that business relies on by implementing major structural reforms in the energy industries of electricity and gas, and encouraging the emergence of alternative and innovative energy sources and technologies.

Queensland has significant proportion of energy intensive industries. These are all related to minerals processing, particularly the production of copper, zinc, lead, nickel, alumina and aluminium. In the near future, Queensland will become an internationally significant producer of magnesium. These industries are reliant on competitively priced and abundant supplies of energy.

Currently coal provides over 40% of Queensland's primary energy needs, and this is projected to remain so in 2009/2010 (ABARE, 1997). In 1995/1996, over 97% of the energy inputs into thermal electricity generation in Queensland were from black coal (ABARE, 1997). While this is

projected to drop to 78% in 2004/2005, the total demand for coal for electricity generation is expected to grow 20% in the same period (ABARE, 1997), reflecting a forecast 60% growth in system energy demand (Electricity Supply Association of Australia, 1997).

Therefore, the total market share of coal in Queensland's energy sector will decrease marginally, if at all, and in the short to medium term, and black coal will continue to play an important role in Queensland's energy sector. However, these forecasts are based on no major shift in policy on greenhouse gas emissions.

It is estimated (Gray and Tomlinson, 1997) that coal use in the United States will increase by 20% between 1996 and 2015. Moreover, the Energy Information Administration forecasts (Gray and Tomlinson, 1997) that coal use will increase worldwide by almost 50% from 5122 million tons annually in 1996 to 7495 million tons in 2015.

- Only 10% of this increase is expected to occur in OECD countries and the former Soviet Union.
- In the developing world, coal use is forecast to increase by 100%.

It therefore appears that coal will remain a major part of the energy mix of Australia, Queensland and the rest of the world for at least one or two equipment generations of about 20 years.

5.0 FACTORS AFFECTING COMPETITIVENESS

5.1 MINE OPERATIONS

5.1.1 Overview

During 1996-97, 44 coal mines operated in Queensland. They can be divided into two broad types, both of which can be further subdivided. The major types are:

(a) Surface mines
(b) Underground mines

(a) Surface Mines

These mines include all operations where strata overlying the coal seams are physically removed to expose the coal. Depending on the quality of the coal and the aggregate thickness of coal present, mining operations can extend to depths of 120 metres, though the economic limit for most normally ranges between 60 metres and 80 metres deep. The total percentage of coal resource recovered is generally quite high, nominally 80% to 90% of the insitu resource tonnage.

The mines can be subdivided on the method of removal and transport of the overburden. Depending on the structural setting and geology of the deposit, the overburden can be removed using draglines and dumped in spoil piles updip of the exposed coal. These are conventional **strip mines** which were extensively developed in the Bowen Basin of Queensland during the 1970's, 1980's and early 1990's. The coal in these mines is generally extracted using front end loaders or small shovels loading into trucks for haulage to the coal preparation plant (Figure 7). The mines are capital intensive to develop and generally require base tonnage contracts of around 4 million tonnes per annum (Mtpa) to be viable. They are also generally not as suited to incremental expansion as other forms of surface mining.

- There are currently 17 mines of this type which produced some 75.7Mt of coal in 1996-97, representing 75.7% of total saleable coal production. Typical examples are Central Queensland Coal Associates' mines of Peak Downs, Saraji and Norwich Park.

With advances in technology over the past decade **open pit mines** using shovels (either diesel or electric) to remove the overburden have gained favour. These **shovel / truck mines** are much more flexible to schedule and operate, and can easily be expanded as markets develop. Coal extraction is basically the same as for the strip mines. The mines can be developed over geologically and/ or structurally complex areas, so that areas previously considered not suitable can be developed.

- There are currently 9 mines of this type which produced 10.7Mt in 1996-97. An excellent example is the Burton Mine. These mines are also more amenable to the use of contractors to carry out the mining operations. Size can vary markedly from less than 100,000 tonnes per annum (Oakleigh) to over 2Mtpa (Jellinbah East). Final feasibility studies for several new mines up to 5 Mtpa have been completed and are nearing commitment (Hail Creek).

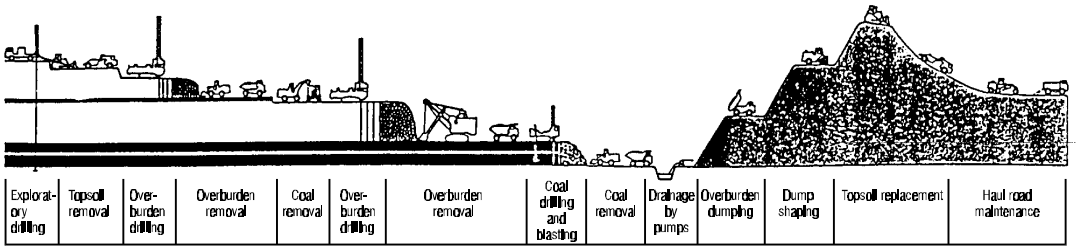
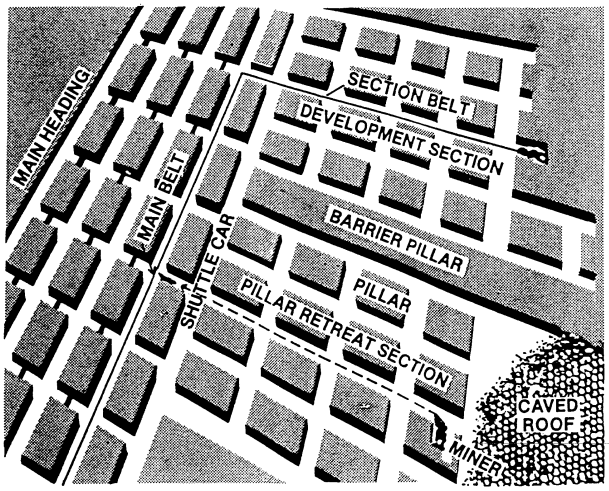
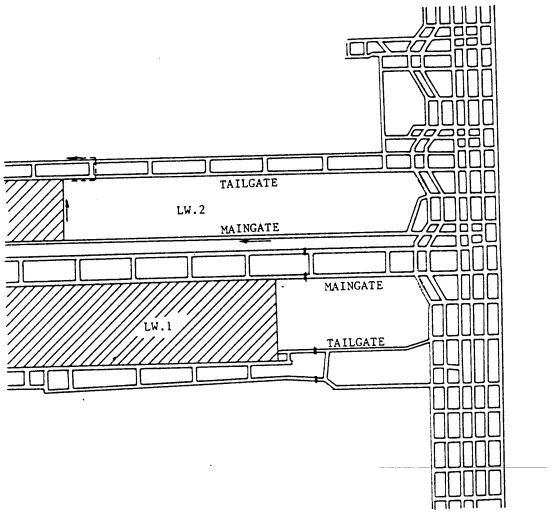


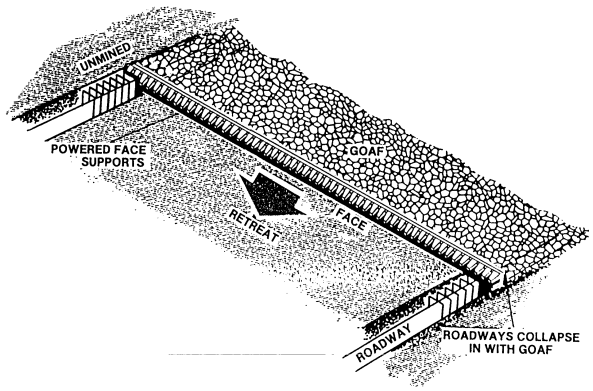
Figure 7. Schematic cross section of the open cut mining process



(a) Bord and pillar layout



(b) Longwall layout



(c) Longwall face schematic

Figure 8 (a) - (c). Schematic of bord and pillar and longwall underground mining methods

(b) Underground Mines

In underground mines the overlying strata is not physically removed prior to extraction of the coal. Types of underground mines are **bord and pillar** (sometimes called room and pillar) (Figure 8) - these were common in Queensland up until the 1980's, particularly on the Ipswich Coalfield. They were generally small tonnage operations up to 300,000 tonnes per annum (though there are exceptions), labour intensive, relative low capital cost to develop, and generally never recovered more than 60% of the insitu coal resource.

- There were 6 bord and pillar mines operating in Queensland at 30 June 1997, the largest of these being Laleham which is a 600,000 tonne per annum mine at South Blackwater. Production from them in 1996-97 totalled only 1.1Mt . There are only three still operating as of 1 November 1997.

In the 1980's **longwall mines** were developed in the Bowen Basin (Figure 8). These mines are more highly mechanised than bord and pillar mines and can have productivities comparable to some strip mines at up to 9,000 tonnes per employee year. To operate successfully they generally require geologically simple and structurally predictable mining conditions. Under ideal conditions extraction rates as high as 90% of the insitu resource can be achieved. Mine development costs are usually high, but can vary markedly depending on their setting and relationship to existing mine infrastructure (if any). Typical mine size is around 2 Mtpa.

- There are currently ten longwall mines operating which produced 11.73 Mt in 1996-97. Four of the ten mines are currently undertaking development work and are yet to commence a longwall face. Trends in the industry indicate that these mines will assume much greater importance in the coming decade as production from opencut strip mines declines.

Under the above definitions **highwall mines** should be considered as a type of underground mine, given that the coal is extracted without removing the overlying strata. They differ from the other types of underground mine in that there are no workers underground as mining is carried out by remote control. Entries to the workings are located in the highwalls of existing open pits which have reached their economic depth limit. The operations are highly mechanised and usually give high productivities because of the nature of the extraction technique and low number of men required to operate the equipment. The per cent recovery of the resource is low and is unlikely to exceed 60%. An estimated 1.2Mt was produced in 1996-97 from this type of mining though approximately 1Mt was added to opencut production for statistical purposes by some companies. This type of mining is usually carried out on a contract basis by outside contractors.

5.1.2 Future trends

There are number of surface mines in central Queensland that have reached or are approaching their economic limit for strip mining (Gregory, Oaky Creek, German Creek, Blair Athol, Riverside and Newlands) within the next few years. Consequently, the importance of this type of mining operation will decrease and be replaced by highwall mining in the short to medium term and by new longwall mines in the longer term at these sites. Longwalls have already commenced at German Creek, Oaky Creek, South Blackwater and Gregory in order maintain production, while trial underground mines are currently operating at both Oaky Creek and at Newlands with the view to committing to longwall extraction in the near future.

Another trend that has appeared recently in the opencut mines is to meld shovel / truck pre-stripping with conventional strip mining in order to reach increased final highwall depths. This

applies particularly to the higher unit value hard coking coal mines where the draglines cannot dig to the final economic highwall depth. Examples are the CQCA mines.

The ratio of opencut to underground employees will gradually change from approximately 3.5 : 1 to approximately 2 : 1 by year 2005 as many of the opencut mines reach final depth.

Average productivity should continue to increase as a result of changes to work practices, however the rate of change could be muted to some extent by the increasing shift to underground operations, particularly during the development phases of underground mine construction.

5.2 **WORK ARRANGEMENTS**

5.2.1 Productivity

Perhaps the most common measure of mine productivity is production per employee per annum. From Table 11 it can be seen that in Queensland production per employee increased from 6,401 tonnes p.a. in 1987/88 to 9,221 tonnes p.a. in 1996/97. It appears that this has been caused by improvements in technology and mining operations. AME Mineral Economics (AME Mineral Economics, Export Coal 1997, page xx) states that Australian coal mine productivity is equal second with Canada at 8,600 tonnes per man year. The USA is ranked first with productivity of 8,700 tonnes per man year.

However, productivity comparisons can be difficult because of the need to compare similar mining operations eg comparing two open cut mines, not an open cut mine with an underground mine. In addition, productivity comparisons based on output per employee do not take into account the total cost structure of a mine operation. Some studies undertaken on a total cost comparison basis tend to show that Australia does not rank as well as it does on a production per employee per annum basis.

A number of indicators of productivity, or an indicator of the use of labour and capital, is the time lost at coal mines due to industrial disputes, sickness, absenteeism and injuries. These highlight some of the differences that result from different types of mining operations. The statistics for 1996-97 are shown in Table 13.

TABLE 13: LOST TIME IN QUEENSLAND COAL MINES 1996-97

	Source of lost time %					
	Sickness	**Disputes**	**Injuries**	**Absenteeism**	**Other**	**Total Lost Time**
Opencut Mines						
Best Practice	0.13	0	0	0.08	0	1.52

Worst Practice	6.55	9.01	0.92	10.63	2.53	14.92
Industry Average	2.05	1.66	0.28	0.84	0.13	4.97
Underground Mines						
Best Practice	0.54	0.6	0.06	0.11	0	2.05
Worst Practice	4.68	5.57	2.27	8.94	2.76	15.96
Industry Average	2.86	2.62	1.02	1.64	0.41	8.67

Note 1. Opencut mines include only those with over 100 employees

Note 2. Underground mines include only those with over 50 employees

Source: Queensland Coal Board

The above table shows:

- That there is a wide divergence between the best and worst performing coal mines in terms of time lost.
- For opencut mines the range is from 1.52% to 14.92%, with an industry average of 4.97%.
- For underground mines the range is from 2.05% to 15.96%, with an industry average of 8.67%.

It appears that there is potential for significant improvement in productivity for the worst performing mines if they reduced their down time. Even a reduction to the industry average should result in a significant productivity improvement.

There are a number of restrictive workplace practices which have developed in the industry over time. These restrictive practices, which are not found in most other industries, have hindered the industry's capacity to respond to changing circumstances and, in particular, the pressures associated with increased competition. These practices differ from mine to mine. However, some which appear to be common to the industry include:

- Principle of last on - first off, rather than engagement, promotion and termination being merit based.
- Contractors prohibited from performing certain work.
- Demarcation as to who performs what work.
- Shift work ie length of shifts and how change of shifts occur, and
- Limitations placed on management's capacity to allocate overtime.

Over the past ten years the number of active coal mines in the State has remained fairly constant at about 40 to 45 with some less efficient or profitable mines closing in this period while a number of new and more profitable mines have opened. Employment levels have also remained fairly static in this period from about 10,300 in 1986 to about 10,800 currently. The big increase has been in productivity, which has seen production increase from 65.8 million tonnes in 1987/88 to 99.4 million tonnes in 1996/97.

Contract prices for thermal coal have fallen by an average 3.6% per annum since 1982. However, due to supply/demand considerations, reductions in production costs through the introduction of improved technology (improved draglines and longwall miners), improvements in management

practices and mine planning in the Queensland industry, and reduction in transport costs (rail and port), mine operators have largely been able to keep pace with these price falls to date.

The Queensland industry is however faced with increasing costs arising from higher strip ratios as the existing open-cut operations dig ever deeper and from the transition to the more expensive and labor intensive underground mining operations now occurring.

These increased costs are not being met with enough other productivity gains in some Queensland mining operations to maintain profit margins. This has contributed to the closures of the Burgowan No 12, New Hill and Oakleigh Underground mines in 1997. Similar contracting margins are believed to behind ARCO's decision to sell its central Queensland coal interests if a buyer can be found, and BHP's current review of its thermal coal mining operations.

The state of industrial relations will be a key factor affecting productivity in the coal mining industry (see also section 5.2.2 below).

One commentator (National Institute of Labour Studies, 1997) has stated that:

- "Overall, the evidence suggests that the Australian coal mining industry is distinctive in terms of human resource performance indicators. No other industry in Australia has the same combination of high employee earnings, high levels of paid overtime but zero levels of unpaid overtime, high rates of absence, low rates of labour turnover, low levels of job satisfaction, high rates of industrial disputation, and high work injury frequency.
- "Hourly earnings are highest in the mining industry, and especially oil and gas and coal mining. In coal mining, hourly earnings for full-time non-managerial male employees in May 1995 were $30.25 which compares with an all-industry average of $17.06."

As companies strive to reduce their costs they have examined the costs of staff (including manning levels and work practices).

One area of possible cost reduction is in the area of work practices and manning levels. A number of newer mines in Queensland (for example Burton) operate on a contract basis. Contract mining is also being used on underground development (Newlands/Oakey Creek) and have much leaner workforce levels than the highly unionised older mining operations and have achieved much higher productivity levels.

This has not been lost on the existing miners and workplace 'reform' is currently high on the agenda at a number of mining operations around the State.

The current world oversupply of coal production capacity means that if Queensland coal mines are to expand their output they will need to improve their productive capacity. Further, if some productivity increases are not made, entire mines may have to close, after being displaced from the market by more efficient competitors, either domestic or foreign.

It needs to be borne in mind that industrial unrest can be caused by either staff, management or a combination of both. While it is common to hear that union work practices in the coal mining industry need to change, it is possible that management practices may also need to be modified. The Industry Commission should be in a better position to comment on this.

Against this background, the Queensland Mining Industry Training Advisory Body (QMITAB) has developed, in concert with mine employers, a new induction training program for employees in the

industry. The Department of Training and Industrial Relations recently has made available funding of $1,176,000 for QMITAB to broker induction training on behalf of mining employers in the mining industry. The mining industry will also contribute to the cost of delivering the training.

This initiative will result in the establishment of a generic training program for the industry that has been created and accepted by the industry and which is based on the new induction requirements set by the Department of Mines and Energy. The development of this new induction program arose from a number of factors. They include the absence of entry level training outside the trades; changing work practices and other practices in the industry; and the training and safety recommendations of Task Group 3 of the Moura Disaster Mine Warden's Inquiry.

5.2.2 Industrial disputation

The coal mining industry has suffered from seriously high levels of industrial disputation. From January 1995 to July 1997 this industry alone has accounted for approximately 40% of all working days lost in Queensland. This comes at a price to the Queensland community as well as to the mine owners.

The main characteristic of the coal industry is a strong union presence. In the past, the industry has been dominated by closed shop arrangements, with restrictive work practices. With the introduction of the recent changes to both Commonwealth and State legislation, industrial reform will have a significant impact on the rate of conflict. These changes are set out in section 6.4 of the Submission.

5.3 OCCUPATIONAL HEALTH AND SAFETY

5.3.1 Introduction

This part deals with the various aspects of health and safety as they impact on the overall structure and effectiveness of the Queensland coal industry. Issues covered include:

- Incident, injury and health statistics;
- The changing legislative structure of health and safety in the Queensland coal industry; and
- The effects this might have on training, recruitment and industrial structures.

5.3.2 Background

At the turn of the century, the health industry was focussed on protection from communicable diseases. By the 1950's, the focus had turned to lifestyle and industrial diseases and their protection. The focus of health and safety needs has recently evolved towards sustainability, empowerment, lifestyle and adaptation to social change. It is in this latter context that health and safety issues in the Queensland coal mining industry are to be analysed. There is a critical need for comprehensive health and safety information to be available so groups and individuals can make informed decisions at the work site and domestic level.

Isolated from change by dated prescriptive legislation, the mining industry is soon to undergo changes necessitated by the coming introduction of 'duty of care' style legislation. A key issue in

this style legislation is the implementation of site managed health and safety programs as a integral part of their work procedures. The development of such programs will, under future legislation, be similar to that required by general industry under Workplace Health and Safety Legislation. This involves participation by employers and workers representatives who have at least some training in the disciplines of ergonomics, legislation and management, occupational health and safety systems.

5.3.3 Incident Statistics

While incident statistics are not collected systematically by the Queensland mining industry, a review of coal Inspectors Monthly reports by Ham and Richardson (1996a and 1996b), identified the more frequently occurring incidents in underground and open cut coal mines. They reported to the industry at the Mining Industry Safety Conference (September, 1996) that loss of control incidents were the most common type of incident in open cut mines and that these were frequently associated with serious injuries. Other common incidents such as fires, electrical shocks and explosive incidents were rarely associated with serious injuries.

The need to develop a systematic program of identifying dangerous incidents in the Queensland mining industry is necessary to be consistent with reporting practices in New South Wales and Western Australia, but this will take the industry and the Department of Mines and Energy some time to fully develop and implement. The reporting of injuries at present fails to adequately identify the cause of the injury and is of little use by itself in the prevention of the recurrence of such injuries.

The objective of the incident database is to provide a pro-active approach to identifying system failures and identifying a means of prevention. As it is with pro-active systems, it requires the cooperation of the target clients - the industry. The industry has contributed via an ACARP Grant to the convening of a workshop /seminar to be held on the development of an incident reporting that examines the strengths and weaknesses of the current corporate and government systems and reports on the clients' needs to provide a blue print for future systems development that is capable of including national mining incident data.

5.3.4 Injury Statistics

The injury statistics for the mining industry in Queensland have recently been compiled. These show that after many years of steady improvement, the number of injuries in underground coal mines has increased slightly. The number of injuries in open cut mines has continued to decline.

In 1996-97 there were four coal industry fatalities - three in underground mines and one in an open cut. Except for the years in which there has been a major mine explosion, this is the highest number of fatalities since 1975. All four coal industry fatalities involved some aspect of equipment design or operation. A key factor in three was a loss of control of the equipment.

- This reflects the failure of the coal industry to match ergonomic design to the development of engineering systems and possibly a lack of training and education in the operation of such systems.

The most common injuries are strains and sprains which account for over half the injuries. The more serious injuries are associated with loss of control of equipment and falls of roof and ground.

5.3.5 Lost Time Statistics

Monthly returns on production and lost time from all coal mines are compiled by the Queensland Coal Board (1995 and 1996) and reported annually.

With respect to the needs for commercial confidentiality, this data can be analysed to produce an industry profile of lost time giving a bench mark of best practice. Individual sites and corporations are entitled to their own data for bench marking purposes. Details are shown in Table 13 in section 5.2.

5.3.6 Health Statistics

As in the New South Wales coal industry, Queensland mine workers including contractors are required to undertake both pre-employment and periodic health assessments. This is provided for under legislation as an Order decreed by the Queensland Coal Board. There is no similar program for metalliferous workers in Queensland, but under the Western Australian Mining Act there is a similar regulation for the whole mining industry.

The 1993 Queensland Coal Industry Employees' Health Scheme provides for a broadly based health assessment program including weight, height, vision, hearing, spirometry, pulse, blood pressure, musculo-skeletal and urinary systems, skin and the abdomen. In some cases x-rays are undertaken. The assessments are administered under the supervision of a medical practitioner appointed jointly by the mine and the Queensland Coal Board. The aim of the assessments are to ensure that the entrant is fit to commence work and the employee is fit to continue work without risk to themselves or others. The scheme is administered at each site by a Nominated Medical Adviser who is familiar with the scheme and task requirements at that site and is committed to ensuring the confidentiality of personal medical information remains secure.

The scheme is administered under the supervision of the Queensland Coal Board who provide for filing copies, and for recording and recovery of statistical information on a data base to provide useful industry wide and mine specific reports. The system provides for the clinical findings on individuals to be forwarded to the Nominated Medical Adviser at the new site when mine workers transfer from one site to another.

The records in the database are compiled to generate site and industry health profiles. Such information is useful for health research purposes and for developing site specific health needs analyses. This data has been used to target health promotion projects at several mines. There is potential for the data to be used to assess the impact of health promotion programs.

Site specific issues include high blood pressure, solar damage to the skin, epilepsy and diabetes. Industry wide issues include tobacco consumption, poor nutrition, lack of exercise, being overweight and hearing loss. Analysis of the database indicates that coal workers pneumoconiosis is no longer an industry issue.

5.3.7 Legislative changes

The policy of the Queensland Government is that new health and safety legislation being prepared for both the coal and non-coal mining industry sectors is to be as consistent as practicable with the *Workplace Health and Safety Act 1995,* the principal workplace health and safety statute for all other industries in Queensland. This is a position consistent with the Industry Commission's proposals (Industry Commission, 1995) for industry specific OHS regimes.

The adoption of an outcome focussed, performance based health and safety legislative regime for the coal mining industry offers significant advantages over the existing prescriptive approach. One of the most important benefits is the capacity to adopt existing national and State workplace health and safety standards applicable to hazards common across all industry including mining, such as standards for noise, hazardous substances, high risk plant and manual handling.

As national standards are developed to reflect the state of knowledge about the particular hazards being regulated, their incorporation under industry-specific regimes such as that for black coal mining will help to provide greater equity in legislative protection for workers in the high risk mining industry relative to that provided for workers in other industries.

The adoption of a statutory expression of the common law duty of care will help minimise the need to create specific regulations to address changing circumstances, including changes in technology and work practices, at the workplace.

The adoption of workplace consultative arrangements similar to those provided in the *Workplace Health and Safety Act 1995* will clarify the rights and responsibilities of workplace parties. Participation and consultation by managers and workers in determining ways to improve workplace health and safety is central to achieving continuous improvement in health and safety performance. This has long been recognised through the legislative provisions dealing with workplace consultative arrangements in the principal statutes of all other (non-mining) Australian OHS jurisdictions.

Prior to the 1994 Moura No 2 Mine explosion, the Department of Mines and Energy in conjunction with the mining industry, had progressed a long way in the revision of the highly prescriptive and complex 1925 *Coal Mining Act* and regulations using an approach based on hazard identification and risk assessment. A number of committees had identified and reviewed the risks associated with coal mining and identified those controls that should be included as a minimum standard in Roben's style 'Duty of Care' legislation.

During the Moura Inquiry, the review of the coal mining legislation was put on hold. The Inquiry was supportive of updating the *Coal Mining Act*, but called for immediate introduction of legislation to cover sealing of mines, the appointment of statutory ventilation officers and the development of site specific safety management and hazard management plans.

The structure of the planned legislation is similar to that in the *Workplace Health and Safety Act (1995)* which covers general industry in Queensland and similar legislation in New South Wales and Western Australia which covers all industry including mining. The draft legislation provides for mines to prepare safety management plans that implement controls appropriate to the conditions at the particular location. This provides for a safety management program that is consistent with the Australian Draft Standard on safety management systems The draft Coal Mining Bill is to be promulgated by June 1998.

Because of the greater reliance on standards and site developed safety systems, the draft Coal Mining Bill provides for minimum qualifications for Site Safety and Health Representatives and Coal Industry Representatives. These officers will be required to have training and be tested in the basics of occupational health, occupational hygiene, safety systems, law and management. Such officers will need both generic health and safety training as well as industry specific training to ensure the relevant applications of occupational health and safety principles. These are workers representatives positions and there is no equivalent statutory requirement to be placed on employers.

It is interesting to observe a reaction from Dr Bill Kirby (AIC OH&S Conference, 1995), the Assistant General Manager of the Joint Coal Board based in Sydney on the application of these principles to the coal industry in New South Wales. He commented, 'The replacement of prescriptive legislation with general duty philosophy in workplace regulation has one major down side, no one will tell you exactly what to do. Unfortunately the bodies who promote such non-prescriptive philosophy are prone to produce masses of paper work in the form of standards and codes of practice to "guide you". Again I emphasise the final decision is for action or in-action is yours. I use the word "unfortunately" from experience. It is not an uncommon occurrence that health and safety people, either professional or voluntary on committees, find themselves immersed in a sea of paper with so many options and qualifications that decision making becomes so bogged down that it never occurs'. The issue is not whether Dr Kirby is right or wrong, but that times have changed and the coal mining community needs to move quickly to adapt to this change.

The development of the appropriate plans, manuals and procedures will be an evolutionary process. These will be the subject of audits, reviews and Coroner's Inquiries. There is currently not a body of expertise in these areas. The Government, industry and unions need to commit a long term program in which the necessary skills and experience are developed across the industry.

5.3.8 Training and recruiting needs

As indicated above, there is a need for a change in the approach of mine management that will come with the introduction of 'duty of care' style legislation. This will include recruitment and training of health and safety professionals with some coal mining exposure. Because of the requirements of the *Workplace Health and Safety Act*, most Queensland tertiary institutions offer generic occupational health and safety courses at either the undergraduate or graduate diploma levels. With the coming changes in coal mining legislation, these courses should be encouraged to include a mining unit. At present, QUT and South Bank TAFE have such programs.

To their credit, a number of employers have foreseen the future needs and support a number of these courses.

5.3.9 Health and safety structures

In general, the larger corporations have well resourced occupational health and safety sections and have resources to call on specialist consultants to address specific needs. The smaller mines and groups call more frequently on the skills and services of the mines inspectorate and the Queensland Coal Board staff.

The coal inspectorate prioritise the frequency of mine inspections in accordance with their perceptions of hazards and risks to personnel at the various sites. Where there are greater hazards and risk, the mines receive more frequent visits and the inspections and discussions are more detailed.

The legislation that provided for the Queensland Coal Board and their Queensland Coal Industry Employees Health Scheme is soon to be repealed with the Health Scheme becoming a regulation under the *Coal Mining Act* and the related powers of the Board being taken by the chief executive. In other jurisdictions such as the International Labour Organisation, the Joint Coal Board in New South Wales and the *Workplace Health and Safety Act*, there is a recognised need to maintain tripartite participation in areas relating to workers health.

The Mining and Energy Division of the Construction, Forestry, Mining and Energy Union (CFMEU) (formerly the United Mine Workers) provide a level of training for mine workers representatives. These training sessions include speakers from a range of areas such as Coal Inspectors and Occupational Health Specialists. The CFMEU also support District Check Inspectors whose function is dedicated to improving mine safety. These officers have participated with government and industry representatives in the various committees associated with the Moura Inquiry implementation process.

The CFMEU had a major impact in convincing the coal industry to support the 1993 Queensland Coal Industry Employees Health Scheme. An equivalent program is not available to the metalliferous industry. The CFMEU representatives support and assist in resolving difficult issues associated with the Queensland Coal Industry Employees' Health Scheme and a variety of safety issues. From a health and safety perspective, the coal unions perform a very important role in the coal mining industry. For such functions to continue without the union structure they would have be resourced by either the government or the industry. In either case, the independence and ownership of such advice from the workers perspective might be questioned.

5.3.10 Conclusions

- Injuries are poor health and safety performance indicators as they do not clearly identify the nature in which the failed system needs to be corrected and it is a reactive measure.
- There is a need to develop a comprehensive incident and injury reporting system that can link in with interstate issues and developments.
- The need is increasing for services in the analysis and dissemination of health, injury and incident data for risk analysis purposes.
- Most injuries are associated with strains and sprains in the workplace.
- The coal industry has an effective health monitoring program.
- The *Coal Mining Act* is soon to be changed from prescriptive legislation to 'duty of care' type legislation which brings the industry into line with general industry and mining in other states. This provides for mines to assess risks and implement appropriate site specific hazard management plans.
- The legislation that provided for the Queensland Coal Board and their Queensland Coal Industry Employees Health Scheme is soon to be repealed with the Health Scheme becoming a regulation under the *Coal Mining Act* and the related powers of the Board being taken by the chief executive.
- The CFMEU plays a useful role in participating in a wide range of health and safety related activities.
- With the changing legislation there is a considerable increase in the demand for employers and workers representatives to have sophisticated health and safety skills.
- The need for workers representatives to access specialist independent technical health and safety advice could be provided from:
  - the unions
  - the government or
  - corporately funded consultants.

5.4 TRANSPORT OVERVIEW

5.4.1 The transport chain

The Transport Chain is a concept based on the sum of its individual transport links. The transport chain concept provides a basis upon which analysis of the transport activities of the coal industry can be undertaken and also enables consideration of the synergy between individual links in the chain.

In the case of the Queensland coal industry, the transport chain incorporates all the activities from the moment the coal is moved from the stockpile at the mines until the ship leaves Queensland waters, or in the case of domestic coal, when the coal is received by the user. Each of these elements can be seen as a link in the transport chain as shown in Map B below.

Coal is moved by rail from the mines to stockpiles located at the terminals. The coal is then reclaimed from the stockpiles, using either stacker/reclaimers or bulldozers. It is sometimes blended with other grades of coal and is then loaded on conveyor belts through shiploaders into the holds of bulk carriers berthed at either offshore or onshore facilities. The ships involved are in the medium to very large category for bulk cargo vessels.

The transport chain for coal in Queensland is a sophisticated system which has developed beyond that of a simple flow of coal from mine via rail to port. There are over 40 mines feeding 5 main rail systems to 6 coal terminals in 4 ports.

Map A shows the QR network of rail systems which links Queensland mines to the export ports.

This transport chain involves a variety of public and private ownership/involvement in a number of interlocking links in the chain. Within each link, there are discrete elements which may differ in both operation and ownership. The capital involved in the provision of the transport infrastructure involved in the links is substantial and there is a considerable level of public sector involvement in the provision of infrastructure.

Due to the nature of sales contracts for coal, the scheduling and loading of ships tends to drive other activities in the transport chain.

5.4.2 World's best practice

The Queensland Government has instigated a number of measures in recent years to reduce the cost of transport for coal while maintaining, over the long run, reliability and providing capacity to meet increasing demand. These include:

- Commercial rail freight rates for all new mines and expansion of existing mines;

- Commercial rail freight rates for established mines when their existing rail agreements expire/or are terminated for mutually beneficial commercial reasons, or by the year 2000, whichever is the sooner.

Queensland Rail to achieve world's best practice (WBP) in export coal haulage by the year 2000.

Comparisons between services may be difficult, particularly if the nature of services provided differ, and the focus should be on the factors which are controllable by the provider. The level of "on demand" operation for transport services in Queensland impacts on the Performance Indicators, particularly price, due to the excessive level of infrastructure required to service the peaks. It is important that comparisons do not result in an attempt to compare a scheduled "bus" fare with an on demand "taxi" fare.

Queensland Export Coal Ports

In regard to ports there is a need to consider differences in volume, unloading method, stockpiling and reclaiming method, land availability for stockpiles, scheduled/on demand service requirements, number of mines serviced, types of coal, blending requirements and capacity, level of vertical integration in the transport chain, maritime features which impact on berth and wharf design.

Work undertaken by the Bureau of Industry Economics (BIE) (Waterfront 1995, International Benchmarking, 95/16, August 1995), showed Queensland's port performance in terms of WBP to be favourable. The BIE stated "Waterfront charges for coal handling in Australia are amongst the lowest in the world.... However, the more expensive of the Australian coal ports are on a par with major overseas ports." (page xiii).

Queensland Export Coal Rail Operations

In regard to rail there is a need to consider differences including distance, volume, terrain, gauge, traction method, scheduled/on demand service requirements, number of mines serviced, level of vertical integration in the transport chain, mixed vs bulk freight dedicated lines, tippler vs bottom dump operation.

In April 1993, the Queensland Government established a target for Queensland Rail's export coal operations to achieve WBP by the year 2000 and for the associated cost savings to be shared between Queensland Rail and the industry.

In 1994 the Queensland Government formed a Joint Advisory Group (JAG) including Government, rail and coal industry representatives to investigate and report on the definition of WBP and the application of this definition to Queensland Rail's export coal haulage operations. A range of indicators and measures were established by the JAG and consultants engaged to assess

key cost and performance components associated with heavy haul railway operations (eg. costs per net tonne kilometre (ntk), labour productivity and asset productivity).

Burlington Northern Railroad Co, a large United States freight railway, was ultimately identified as one of the best performing railways in the world and the most appropriate benchmarking partner for Queensland Rail because of the similarity of operations.

More than 70 benchmarks in areas such as rollingstock productivity, labour productivity, maintenance costs and administration costs were utilised. The benchmarking exercise showed that Queensland Rail's export coal operations compared favourably with many of the best railway operations, rating in the top ten for many of the performance measures. However, after discounting for the structural differences between Queensland Rail's and Burlington Northern's operating environments, the gap to world's best practice was approximately 18%.

Subsequent reviews of Queensland Rail's progress towards WBP showed that in 1994/95 Queensland Rail had reduced the WBP gap.

While the Government and Queensland Rail remain committed to export coal rail operations being at the best practice level by 2000, it is becoming increasingly difficult to compare the more recent results in the same manner as in previous years. This is due to both the difficulties associated with an ongoing benchmarking exercise and the 1996 merger of Burlington Northern with another large United States freight railroad - Sante Fe Southern Railroad - which significantly changed the nature of the cost structures being compared.

5.4.3 Infrastructure issues

Coal transport infrastructure has long design and construction lead times, is expensive, long lived, and has limited alternative uses. In addition, all infrastructure used in the transport chain is not compatible, eg tippler wagons and electric locomotives cannot be used throughout the system.

The indivisible or 'lumpy' nature of infrastructure contributes to the level of spare capacity. The total level of spare capacity which exists in the transport chain is related to varying levels of spare capacity which exist over time in each of the components.

Infrastructure capacity is determined by many requirements, including a number which are outside the direct control of the service provider such as size and sequence of ships to be serviced, de-ballasting time and blending requirements.

Infrastructure utilisation can be improved by smoothing out the peaks and troughs of demand. In this regard, balancing of the infrastructure requirements and costs of links in the transport chain ie mine stockpile costs, rail costs, terminal stockpile costs, terminal and port costs, requires ongoing fine tuning.

In Queensland, infrastructure is provided on a demand based, commercially viable approach. Users are consulted to gain a common understanding of the nature of demand prior to undertaking transport infrastructure planning. In Queensland, no Government subsidies are provided for the transport of coal.

Stockpiles at mines and ports act as buffers in the transport chain and are managed by the mine owners. There is a requirement for a level of spare capacity and buffers to ensure reliability of

supply. In the case of rail, reliability is enhanced, particularly in the Bowen Basin, by the flexibility of the single service supplier (QR) being able to relocate rollingstock easily.

The Government Owned Corporations (GOCs) are the appropriate source of data in regard to infrastructure, pricing and productivity levels. It is understood that individual transport GOCs will be providing separate submissions to the Industry Commission.

5.5 **RAIL**

Queensland Rail operates all rail systems involved in moving coal to either Queensland's export sea ports or major domestic users. Queensland Rail operates in accordance with the provisions of the *Transport Infrastructure Act 1994* and the *Government Owned Corporations (GOC) Act 1993*. The Queensland Rail management structure includes the Coal and Minerals Business Group which is responsible for the rail transport of coal.

Over the past 30 years, Queensland Rail has transformed its operations from steam-hauled trains of 400 tonnes to two-kilometre long electric trains capable of hauling 7500 tonnes of coal (rising to 9600 tonnes per train in the near future). Significant improvements over the years have included electrification of a significant part of the network, state of the art signalling, automated track maintenance, computerised driver simulation training, expansion of the rollingstock fleet and upgrades of track and bridges.

Queensland Rail's export coal network currently comprises approximately 2,000 km of track which is of a high standard, almost half of which is electrified. Computerised centralised traffic control (CTC) operates over approximately 1,300 km of this network, with the remainder being worked under automatic signalling and train order working.

The Bowen Basin coalfields are serviced by four rail systems, all connected to the east coast main line. There are two major electrified rail systems which service the centre of the Bowen Basin and two diesel systems which service the northern and southern edges of the Bowen Basin. The two electrified systems are also connected by a dedicated inland line. A diesel system services the West Moreton coalfields and connects the southern Surat Basin to the Port of Brisbane. All coal rail lines are 3'6" gauge .

Diesel and electric locomotives are used to haul wagons. With the exception of gondola wagons which operate to the Hay Point Services Terminal, a range of various capacity bottom dump wagons are used to haul coal to the other terminals. The rolling stock configuration varies between systems to take account of local track design parameters.

Table 14 details the variety of train consists used in the Queensland coal rail networks, the train load capacity of each type, both in use and proposed, and the total tonnage of coal (both export and domestic) carried in 1996/97 by rail.

The rail infrastructure is well developed and plans are in place to further improve both productivity and capacity. A further extension to the system involving construction of the extension of the Moura system south to Theodore is currently under consideration.

Details of the coal rail transportation systems can be found in Appendix VI.

TABLE 14: QUEENSLAND COAL RAIL SYSTEMS

Coal rail system	**Consists**		**Train load (tonnes)**	**Export tonnage hauled 1996/97 (mt)**	**Domestic tonnage hauled 1996/97 (mt)**
	Locos	**Wagons (a)**			
Newlands	4 (diesel)	82 (b)	4700	6.34	0.94
Goonyella	Current: 4 (electric) Future: 5 (electric)	136 & 108-128 122 (c)	7500 9600	48.91	
Blackwater	Current: 4 (electric) Future: 5 (electric)	102 122 (d)	5500-6200 9600	20.76	
Moura	3 (diesel)	61(e)	3200	4.44	
West Moreton	2 (diesel)	39 (f)	1800	2	0.31
Totals				82.46	8.57 (g)

Source: Queensland Rail

Notes:

(a) All wagons are bottom dump except where noted below.
(b) 82x73 gross tonnes
(c) 136x71 gross tonnes tippler
128x80 gross tonnes
108x90 gross tonnes
122x104 gross tonnes (proposed)
(d) 102x71&73 gross tonnes
122x104 gross tonnes (proposed)
(e) 61x71 gross tonnes
(f) 39x63 gross tonnes
(g) The total tonnage of domestic coal moved includes some 7.32 million tonnes of coal (not differentiated) hauled via the Goonyella, Blackwater and Moura lines to such domestic facilities as the Gladstone powerstation, QAL, cement works at Gladstone and Rockhampton, and the Stanwell powerstation.

5.6 **PORTS**

5.6.1 Summary of export coal port infrastructure

Queensland coal is exported from the ports of Abbot Point, Hay Point and Gladstone in Central Queensland and Brisbane in south east Queensland. The industry is serviced by six export coal terminals operating at these ports.

Three of the terminals are owned by public bodies and three are private terminals. All of these terminals are privately operated with the exception of the R G Tanna Coal Terminal in Gladstone which is publicly operated.

A high degree of dedication of mines to terminals exists and this has developed due to factors including the operational arrangements and the need to minimise the land distance between the mine and the terminal.

Plans exist to expand the capacity of both the Hay Point Services and Dalrymple Bay Coal Terminals at Hay Point and the R G Tanna Coal Terminal in Gladstone. These plans include both committed and proposed expenditure and are linked to forecast increases in demand.

The pattern of trade, the range of ship sizes, and the limitations of receiving ports impact on terminal capacity.

Queensland Government owned Port Authorities that handle coal were corporatised in 1994. They function as separate financial entities and are largely autonomous in their day to day operations. With the exception of the Gladstone Port Authority, which provides bulk coal loading services, the other coal port authorities (which operate the Ports of Hay Point, Abbot Point and Brisbane) restrict their activities principally to the provision of some terminal infrastructure, shipping channels, swing basins and berths.

Queensland Transport provides and maintains navigation aids, and provides accurate and timely hydrographic and tidal information for charting, safe navigation and public information.
The ports of Gladstone and Brisbane handle a variety of cargo types, including coal, and serve the transport needs of their particular region.

The Ports Corporation of Queensland (PCQ) ports at Hay Point and Abbot Point are dedicated export coal ports. While the administrative control of PCQ ports is centralised in Brisbane, individual ports operate on a separate financial basis with no cross-subsidisation between them. The on-site operation of terminal facilities at the ports is left to private companies established by the predominant users.

The relationship between the ports, port authorities, coal export terminals, terminal owners and operators is shown in Table 15.

The total tonnage of coal exports through the coal ports of Queensland in the period 1992/93 to 1996/97 is shown in Table 16.

TABLE 15: COAL PORT TERMINAL OWNERSHIP

PORT	PORT AUTHORITY	TERMINALS	TERMINAL OWNER		TERMINAL OPERATOR
			Onshore	**Offshore**	
Abbot Point	Ports Corporation of Queensland	Abbot Point Coal Terminal	Ports Corp of Qld	Ports Corp. of Qld	Abbot Point Bulk Coal Pty Ltd
Hay Point	Ports Corporation of Queensland	Hay Point Services Terminal	Central Qld Coal Assoc. (BHP)	Central Qld Coal Assoc. (BHP)	Hay Point Service Pty Ltd

		Dalrymple Bay Coal Terminal	Ports Corp. of Qld	Ports Corp. of Qld	Dalrymple Bay Coal Terminal Pty Ltd
Gladstone	Gladstone Port Authority	R G Tanna Coal Terminal	Gladstone Port Authority	Gladstone Port Authority	Gladstone Port Authority
		Barney Point Coal Terminal	BHP/Mitsui	Gladstone Port Authority	P&O Ports
Brisbane	Port of Brisbane Corporation	Fisherman Islands	Queensland Bulk Handling	Port of Brisbane Corp	QBH Pty Ltd

TABLE 16: TOTAL COAL EXPORTS THROUGH QUEENSLAND PORTS
(1992/93 - 1996/97)

PORT	1992/93	1993/94	1994/95	1995/96	1996/97
Abbot Point	5 871 452	4 759 853	5 239 424	4 913 922	6 167 045
Hay Point					
Dalrymple Bay	18 147 547	20 604 001	22 071 647	21 039 087	24 272 584
Hay Point	24 629 463	23 394 720	24 647 649	24 186 203	22 372 725
Gladstone					
R G Tanna	17 904 495	17 876 685	21 484 655	20 353 878	22 524 699
Barney Point	2 051 169	2 087 355	1 833 443	2 623 062	1 646 342
Brisbane	2 849 975	2 848 436	2 827 159	3 022 089	2 381 156
Totals	71 454 101	71 571 050	78 103 977	76 138 241	79 364 551

Sources: Ports Corporation of Queensland
Gladstone Port Authority
Port of Brisbane Corporation

5.6.2 Reforms

As noted above, Queensland ports are corporatised entities under the *Government Owned Corporations (GOC) Act 1993*. The three largest ports - Gladstone Port Authority, Port of Brisbane Corporation and Ports Corporation of Queensland - were corporatised on 1 July 1994. The remaining regional ports - Cairns Port Authority, Townsville Port Authority, Mackay Port Authority, Bundaberg Port Authority and Rockhampton Port Authority - were corporatised on 1 July 1995.

Corporatisation involves significant structural reform designed to place entities on a more commercial basis and at "arms-length" from government. As corporatised entities, Queensland's ports have a commercial charter and their Boards are accountable to shareholding Ministers for

their performance. The shareholding Ministers of Queensland's Port Authorities are the Treasurer and the Minister for Transport.

As part of an annual planning process, performance targets are agreed between the Board and shareholding Ministers through the Statement of Corporate Intent (SCI). Performance targets include both financial indicators (rate of return targets, earnings before interest and tax, capital structure targets) and non-financial indicators (throughput, efficiency and service quality targets). Performance against the targets is monitored on an on-going basis. This performance monitoring regime is intended to increase commercial discipline on ports for them to operate efficiently and to ensure that commercial rates of return are being achieved on government owned port assets.

Ports in Queensland historically follow the 'landlord' model which involves port authorities providing land and other basic infrastructure, with many of the activities within the port undertaken by the private sector. However, there are exceptions to this, most notably Gladstone Port Authority, which also operates as a bulk coal loading service at its coal terminal.

An overview of coal handling port facilities in Queensland is outlined in Appendix V.

5.6.3 Port pricing arrangements

All government owned ports in Queensland are corporatised. This means that they operate at "arms length" from government in terms of both their day to day operations and their pricing arrangements. Consequently, port charges are negotiated between ports and their users on a commercial basis, without government involvement.

However, to address any concerns relating to possible monopoly pricing, the Queensland Competition Authority (QCA) has responsibility for prices oversight of government business enterprises. The role of the QCA in this regard is discussed in detail in section 6.3.

A number of important assumptions relating to asset valuation and rate of return targets underpin the agreements between ports and their users. As part of the corporatisation process, port GOCs' assets were valued in accordance with the Queensland Government's Asset Valuation Guidelines, which are based on the 'deprival value' methodology. In addition, port GOCs strive to achieve long run rates of return on these assets consistent with the weighted average cost of capital for the port. Short term targets are agreed between shareholding Ministers and boards as part of the annual SCI negotiation process and port performance is monitored against these targets. Consequently, underlying assumptions relating to asset values and rate of return targets will have an impact on port charges negotiated as part of User Agreements. As noted above, these pricing arrangements are subject to the scrutiny of the QCA. It should also be noted that, where certain assets have been funded by users rather than the port GOC itself, these assets are excluded from rate-of-return calculations for the purpose of performance monitoring.

5.7 **OTHER TRANSPORT MODES**

A very small proportion (around 2%) of coal produced in Queensland is moved by road from the mine. Most of the road movement involves supply to domestic customers.

An even smaller amount of coal is barged down the Brisbane River from the West Moreton coal fields to the export terminal at the Port of Brisbane.

5.8 **WATER**

Water is a critical element in the coal production although a relatively minor input into the overall production process. A high reliability water supply is however essential as a lack of water can cause a costly shut down.

In Central Queensland, the issue of water supply is one of the major problems confronting future expansion of the coal industry. With regards to the existing allocation of water rights, the Queensland Government is currently considering the policy implications of permanent transferability of water entitlements between sectors (eg between the industrial and irrigation sectors), an arrangement which is currently prohibited. Tradeable water entitlements may alleviate some water shortage concerns.

With regards to expanding the supply of water, the Queensland Government is currently investigating alternative dam sites in the region, however, the dams have yet to be approved. Water availability is subject to the catchment based Water Allocation and Management Plans of the Department of Natural Resources.

Water price to a coal mine needs to cover the full cost of water storage and transmission. The price of water used by coal mines is typically substantially higher than the price of water supplied to irrigation areas in the same area. The price difference is due in part to the different levels of reliability of supply. The provision of a quantity of high reliability industrial water requires the storage of substantially more water than the provision of the same quantity of lower reliability irrigation water.

Water storage and transmission infrastructure may either be constructed by the coal mining companies themselves, or by the Department of Natural Resources.

Where private sector companies build, own and operate the storage and transmission infrastructure, the private sector companies bear all the costs of operating and maintaining the system. However, the Government may make a contribution to the costs of operation where the infrastructure also will supply stock and domestic users. This Government contribution is negotiated with the private sector owners.

Where the Government owns the water storage and transmission infrastructure, its operation and maintenance is the responsibility of State Water Projects, the commercial arm of the Department of Natural Resources. The industrial water price would be negotiated between the coal miner and State Water Projects and an Agreement established, usually for the life of the mine. The water price would cover the operation, maintenance, administration and refurbishment costs of the infrastructure, as well as a commercial return on capital. This return on capital may be adjusted to reflect any upfront capital contribution to infrastructure costs, depending on the negotiated agreement. If there are other users on the system, the price covers an ascribed share of operation, maintenance, refurbishment and capital costs.

State Water Projects is currently being commercialised to focus on reducing costs, where possible and increasing the efficiency of water delivery. These gains may not be realised immediately by existing coal mines where they are party to long term water supply agreements.

Under the *Water Resources Act 1989*, coal mining companies must obtain a licence for construction and use of referable dams (greater than 10m in height or 20000 cubic metres in volume), which includes tailings dams which may control hazardous waste. The Department of Natural Resources

monitors all referable dams for safety considerations. Infrastructure must also comply with environmental guidelines set down by the Department of Environment.

5.9 **ROYALTY REGIME**

In Queensland, with very few exceptions, property in minerals, including coal, is reserved to the State. Royalty is the payment made for the mining of the coal resource. With most property in coal reserved to the State, the overwhelming majority of coal royalty is paid to the State. Nevertheless, some privately held coal resources do exist, and these give rise to private royalties.

Since 1 January 1994 the royalty payable on all (State and private) coal mined in Queensland is 7% of the coal's value (Schedule 1 of the *Mineral Resource Regulation 1990*).

The "*7% ad valorem*" royalty regime is subject to the following transitional arrangements:

1. Export coal hauled under certain written rail haulage arrangements is "grand fathered" from the application of the new coal royalty regime until the relevant agreement expires. Until then, the "grand fathered" coal continues to be subject to the lower export coal royalty regime in existence pre-1 January 1994, namely:

    - open cut mine: 5% of the coal's value; or
    - underground mine: 4% of the coal's value.

2. Domestic coal, which until 1 January 1994 was subject to a royalty of only 5 cents per tonne, is being gradually introduced to the 7% regime, in 1% increments each year. The 1994 royalty rate for domestic coal was only 1%, and the current 1997 rate is 4%. Domestic coal will only be subject to the full 7% royalty from 1 January 2000.

The "coal's value" on which royalty is assessed is determined at the discretion of the Minister.

The point of valuation has been established essentially as the point where the coal is loaded into rail wagons at the mine, that is, the "free on rail" (f.o.r.) value (also called the "ex mine" value).

Export coal is typically subject to an arms-length sales contract struck on "free on board" (f.o.b.) terms (i.e., valued at the point where the coal has been loaded onto the ocean vessel). The "f.o.r." value of the coal is arrived at by a "net-back" procedure. Under net backing, all of the direct costs incurred after the coal is loaded into the rail wagons at the mine up until the f.o.b. point of sale are deducted from the f.o.b. price, thereby arriving at the imputed f.o.r. value of the coal.

Principally, deductible costs include rail freight (by far the major component) and port costs. Where rail and port facilities have been financed by non refundable capital contributions, an amortisation deduction based on established principles is also allowed. Other sundry items allowed as a deduction against the f.o.b. value in arriving at the f.o.r value include dispatch and demurrage, coal research levy and, as a special concession, the long service levy.

Domestic coal is similarly valued on a "f.o.r."/"ex mine" basis although it should be noted that a material proportion of domestic coal is sold on f.o.r./ex mine terms in any event.

In the early 1990s the royalty regime for coal underwent a major review in conjunction with the process of commercialising the role of QR in the negotiation of new coal rail haulage agreements

with miners. Prior to this commercialisation of QR, the setting of coal rail freight rates took into account State revenue considerations.

Following the commercialisation of QR, the setting of coal rail freight rates are based solely on commercial considerations of the cost, both operating and capital, of providing rail transport services to coal mines.

The financial impact of removing direct State revenue from coal rail freight rates was partially offset by the new 7% coal royalty regime which commenced 1 January 1994.

The Government, in announcing the new 7% regime in September 1993, stated that all pre-existing coal rail haulage arrangements would continue in operation until their respective expiry dates, subject to a commitment that arrangements with an expiry date beyond 2000 would be given the opportunity to renegotiate in 2000. An exception was provided for cases where premature termination gave rise to mutual benefit.

A small number of pre-commercialisation rail haulage arrangements are still in existence. The coal hauled under these arrangements is still grand fathered from the 7% royalty regime.

In addition, there are a number of post-commercialisation rail haulage arrangements in place that include a "Resource Utilisation Charge" (RUC). The RUC is a revenue clause inserted by the State into rail haulage arrangements otherwise negotiated commercially between QR and coal producers. RUCs were inserted in commercial contracts as a revenue preservation measure during the hiatus between commercialisation of QR's coal haulage activities in the early 1990s, and the implementation of the new regime from 1 January 1994 (following the conclusion of the royalty/rail freight review in September 1993).

Rail haulage agreements with such "RUCs" are also grand fathered from the 7% royalty regime until the expiry or termination of the agreements.

Overall, the process of phasing in the new 7% regime to all coal, and phasing out the remaining pre-commercialisation rail haulage arrangements, as well normalising domestic and export coal royalties, was the subject of very careful financial planning around the year 2000 as the date the new system would be fully implemented. That planned phase-in is still on track.

A recent change to the royalty regulations concerned five of the BHP operated mines of Goonyella, Norwich Park, Peak Downs, Saraji and Riverside. All of these mines which had pre-commercialisation rail haulage arrangements. However, in return for the payment of a "special royalty" to offset the loss of State revenue, the State agreed to terminate the arrangements in advance of the respective expiry dates. The State, in agreeing to the premature termination of the pre-commercialisation rail haulage arrangements, released the mines to negotiate new rail haulage contracts incorporating the latest operating and capital efficiency gains.

The State has offered similar arrangements to other mines with pre-commercialisation rail haulage contracts still in existence.

The "ad valorem" royalty regime has worked well for coal over the years. It provides a relatively stable, predictable, and administratively simple revenue stream for the Queensland Government without the need for interpretation and lengthy discussion in relation to profit determination.

In terms of interstate comparison it is useful to compare with the coal royalty regime in New South Wales. The prescribed rate has been $1.70 since 1981 with an additional "super" royalty of $0.50 per tonne applying to most production from open cut mines. The $0.50 royalty has applied since 1987, but was higher for a period prior to this.

Given that the Queensland royalty is ad valorem based, and accordingly will vary depending on whether a mine is paying the new 7% rate, or the 4%/5% rates, and also whether it is producing predominantly lower value thermal or higher value coking coal, a direct comparison on an average rate per tonne basis is difficult. However, the 7% rate applied to a coking coal mine would probably translate to at least $3.00 per tonne, whereas the current rate of 4% applying to a mine selling coal in Queensland in 1997 would equate to approximately $1.00 per tonne.

The present system of royalty collection on coal is working effectively, and is about mid-way in the process of phase-in to full implementation. No changes to the royalty system are envisaged. A current review of the changes introduced to the coal royalty system in 1994 is being conducted in accordance with a Government commitment at the time.

6.0 GOVERNMENT'S IMPACT ON THE COAL INDUSTRY

The two broad spheres of impact, from a State Government's perspective, for the black coal industry are:

- In setting the appropriate regulatory regime that will promote competition and efficiency in key input industries, and which will allow the market to operate most efficiently; and
- Where government is the owner of dominant portions of input industries, implement reforms designed to ensure that those providers are operated at peak efficiency.

Accordingly, the following sections describe the various areas where government may have an impact within these two broad spheres of impact.

6.1 STRUCTURAL REFORM

A key area where government may have a considerable impact on the cost structure and, therefore, the international competitiveness of the black coal industry (and, indeed any industry) is structural reform of key input industries (such as transport, energy and water supply industries). Governments have, in the past, required publicly-owned utilities, usually acting as monopolies, to undertake a variety of tasks, including to fulfil social welfare goals of Government. This requirement often conflicted with the primary task of the utility, reduced incentives to improve efficiency and led to poor performance. Monopoly pricing of industry inputs provided a revenue source to Government or provided the funds to cross-subsidise other activities.

Key elements of structural reform are:

- Removal of any responsibility for industry regulation from a public monopoly so as to prevent the monopolist enjoying any regulatory advantage;
- Separation of natural monopoly elements from potentially competitive elements of the public monopoly;
- Separation of the potentially competitive elements; and
- Introduction of competitive neutrality measures.

These reforms are designed to increase the level of competition in the industry and to remove any potential for abuse of market power (for example, by way of monopoly pricing).

With respect to the black coal industry, key input industries dominated in the past by government owned monopolies or partial monopolies (eg there isn't a monopoly by Government on coal terminals at Gladstone or Hay Point) include: water, rail, electricity, gas and ports. However, each of these former monopolies is either currently undergoing or has been the subject of structural reform. Further details of the nature of these structural reforms may be found in sections 5.6, 6.1, 6.2, and 6.3, respectively.

The key reform models utilised by the Queensland Government to achieve structural reform are:
- Corporatisation (under the *Government Owned Corporations Act*); and
- Commercialisation.

6.2 CORPORATISATION

6.2.1 Background

Corporatisation is a structural reform process which changed the conditions under which GOCs operate. As far as practicable, the GOCs operate on a commercial basis in a competitive environment while allowing the Government, as owner, to continue to provide broad direction by setting key financial and non-financial performance targets and community service obligations.

In 1992 the Queensland Government issued a white paper entitled "Corporatisation in Queensland - Policy Guidelines". The principles detailed in the white paper are embodied in the *Government Owned Corporations (GOC) Act 1993*, which provides the legislative basis for corporatisation. Individual commercial charters for each transport GOC have been established and apply these principles to the specific situation of each GOC.

Three of Queensland's Port Authorities were corporatised on 1 July 1994, the remaining five and Queensland Rail (QR) were corporatised on 1 July 1995. Changes brought about by corporatisation, in conjunction with third party access, permits greater competition and flexibility in rail haulage operations. The Queensland Electricity Supply Industry (QESI) has also been corporatised, including significant structural reforms aimed at separating natural monopoly (transmission) from contestable (generation and distribution) (see section 6.3.1) elements.

6.2.2 Main features of corporatisation in Queensland

Once corporatised, Government businesses are referred to as Government Owned Corporations (GOCs). The main features of the corporatisation process in Queensland are:

- The separation out of monopoly elements of a GOC's commercial activities to facilitate a more competitive industry structure. For example, the more contestable area of electricity generation and distribution has been separated from the monopoly activity of transmission by the formation of new GOCs to undertake these activities;
- The dismantling of barriers to competition;
- Divorcing GOCs of regulatory functions so that they have a strictly commercial charter;
- Neutralising advantages and disadvantages resulting from Government ownership of GOCs to ensure that they operate, as far as possible, on a neutral basis with the private sector. For example, where appropriate, GOCs will be charged guarantee fees to neutralise cost of funds benefits resulting from Government ownership. Also, GOCs are subject to the *Trade Practices Act* and other regulations that are applicable to the private sector;
- Requiring GOCs to operate commercially by imposing long term rate of return targets on assets and requiring GOCs to make tax equivalent payments and pay dividends;
- Making GOCs accountable for their performance. All GOCs are to have highly qualified commercially-oriented boards and are subjected to rigorous performance monitoring, including the establishment of performance targets and benchmarks;
- Transparent funding and reporting on Community Service Obligations (CSOs) and the establishment of service contracts in respect of CSO provision;
- Independent prudential supervision;
- Access to essential facilities such as electricity transmission lines; and
- Prices oversight of those GOCs which retain monopoly power, to ensure that they do not abuse their monopoly status.

6.3 COMPETITION POLICY

6.3.1 General

Competition Policy is another key area where government has the potential to impact significantly upon the competitiveness of the black coal (and other) industry. In particular, the implementation of competition policy in Queensland has resulted in the establishment of:

- A third party access regime (which will apply to QR's tracks, the electricity grid and water infrastructure);
- A monopoly prices oversight regime to ensure that government monopoly businesses (such as elements of QR, the electricity corporations and the bulk water supply industry) do not abuse market power by way of monopoly pricing; and
- A competitive neutrality complaints mechanism.

These regimes are all established under the *Queensland Competition Authority Act* and are regulated by the Queensland Competition Authority (QCA) which was established as an independent regulatory body on 1 July 1997.

The establishment of the third party access regime will possibly be an important factor for the costs structure of the coal industry as it will facilitate competition in the coal haulage market by permitting rail haulage operators (other than QR) to supply mine-to-port services. The extent to which haulage prices will be reduced will depend upon a number of factors including the relative efficiency of the transport chain from mine to port.

The complaints mechanism, in conjunction with third party access dispute resolution provisions, will provide a mechanism for complaints in relation to pricing practices to be reviewed.

A key issue in terms of third party access, prices oversight and competitive neutrality will be the impact of asset valuation and rates of return on prices charged by these government businesses. In this regard, it is important to note that:

- Rates of return set are commercial rates of return; and
- In the event of a dispute between a private operator and a government business, the QCA may act as arbitrator. Reports of the QCA will be publicly available.

The GOCs are the appropriate source of data in regard to infrastructure, pricing and productivity levels. Individual GOCs will be providing separate submissions to the Commission.

Preparation of the Environmental Protection Policy for the mining industry is in progress and is not expected to substantially alter the national or international competitiveness of the black coal industry. It may promote competition and reduce minor distortions in the current market.

6.3.2 Energy aspects

Against the background of the above general competition policy framework, significant progress has occurred in electricity reform in Queensland:

- In May 1996, the Queensland Minister for Mines and Energy signed the National Electricity Market Legislation agreement committing the Government to membership in the National Electricity Market Management Company, NEMMCO, and the National Electricity Code Administrator, NECA, and further reforms in the Queensland electricity industry.

- Since then, the Government has established the Queensland Electricity Reform Unit to implement the structural reforms necessary to enter the National electricity market.
- The enabling legislation was passed in early 1997.

National gas reform is being pursued by all jurisdictions:

- The reform will remove all legislative and regulatory impediments to free and fair trade in natural gas, and to ensure a uniform national framework for third party access applies to all gas transmission and distribution pipelines;
- The reform will be implemented through the National Third Party Access Code. The intention is that the Code will replace existing jurisdictional gas access regimes.
- In Queensland, this means the Code will replace Part 8 of the *Petroleum Act 1923* and some sections of the *Gas Act 1965*. The Code is designed to facilitate commercial negotiations between parties for access to the services of specific gas infrastructure facilities when such access is necessary to promote competition in related markets.
- The Code is nearing completion, and the lead legislation is expected to be considered by the South Australian Parliament in late 1997. The Queensland Parliament will consider enabling legislation shortly afterwards.

The impact of these reforms on the black coal industry, coupled with rail reform, are expected to be the following:

1. The development of a National gas market, coupled with the proposed construction of a natural gas pipeline from Papua New Guinea to Gladstone, will see more competition in gas prices. This will lead to operators of new electricity generation plant to examine options of gas fired base-load stations or co-firing coal and gas. Existing power plant operators may also examine the possibility of converting existing plant to burn other fuels. These trends may limit the growth of the market for coal for power generation or drive down the price of coal.

2. The introduction of competition in electricity is expected to lead to pressure on generators to negotiate more aggressively on coal prices. However, where coal fired power stations are not immediately adjacent to a coal mine, reforms in access to rail freight may not mean that the revenue that coal producers receive will drop. In addition, in the medium to long term, a National market for electricity could provide opportunities for additional generation capacity in Queensland through the planned interconnector with the NSW grid.

3. The expected reduction in rail freight charges associated with competition for rail haulage will lead to improved competitiveness of Queensland coal on international markets. Given the strong export orientation of the Queensland black coal industry, this is expected to be a significant impact of national market reforms on the industry.

6.4 **INDUSTRIAL RELATIONS POLICY**

6.4.1 Introduction

Both the State and Commonwealth have jurisdiction in the black coal industry. The mining of the coal is subject to the federal jurisdiction, where as the rail freight from the mine to the coal loading terminal is governed by the State Act. The loading of coal from terminal to ship can be State or Federal as it varies from facility to facility.

- Prior to 1994 workplace relations in the coal industry was primarily regulated by the Coal Industry Tribunal which was established in 1947 under joint Commonwealth and State legislation (the *Coal Industry Acts*) as a special arbitration tribunal.

- However under amendments introduced in Parliament in 1994, the Coal Industry Tribunal was abolished. Industrial relations issues in the coal industry are now dealt with by the AIRC as part of its general jurisdiction over industrial matters.

6.4.2 New Legislation

The Commonwealth's *Workplace Relations Act* came into operation on 31 December 1996. The Queensland *Workplace Relations Act 1997* largely reflect similar changes to those made to the Commonwealth Act.

- The key feature of the revised legislative framework is that it allows employers and their employees to establish fair and flexible working arrangements at the workplace by facilitating three options for making agreements -

  – certified agreements directly with employees;
  – certified agreements with unions; and
  – individual agreements through Queensland Workplace Agreements (State) or Australian Workplace Agreements (Federal).

Further, the legislation does not prevent employers and employees from making agreements outside the formal industrial relations system through 'over award' arrangements, provided they are not inconsistent with the appropriate Act.

In all cases the agreements under either Act will be subject to a "no-disadvantage" test and will need to be approved, in the case of certified agreements, by the AIRC for federal agreements and the QIRC for the Queensland agreements. In the case of Queensland Workplace Agreements (QWAs) they are to be certified by an enterprise commissioner within the QIRC. The same process will be followed with Australian Workplace Agreements (AWAs) but being approved by either the AIRC or the Employment Advocate.

Further flexibility is provided by the legislation in that a AWA can be negotiated while a certified agreement is in place provided that it is allowed for by the certified agreement. A QWA can be negotiated while a certified agreement is in place. This will accommodate the needs of individual employees and changed circumstances. Employees will be protected, as the no-disadvantage test will be applied against entitlements under the certified agreement.

- The award system is to be maintained, with the role of awards being to provide a safety net of fair minimum wages and other arrangements. The Commission's role is that of establishing and maintaining a safety net of fair minimum wage conditions.

Awards will be simplified so that they do not impair flexibility at the workplace. They will be confined to 20 allowable matters which will collectively provide a safety net of minimum wages and employment conditions. The 20 allowable matters are set out in Section 128 of the Queensland Act and Section 89A of the Federal Act. Other matters which are incidental to the allowable matters can be included if they are necessary for the award to operate effectively.

- The new law protects the rights of individuals to join or not join industrial organisations of their choice. Similar provisions apply to both employee and employer organisations to ensure that the rights of individuals are respected and quality services are provided to members.

- The legislation restores a 'fair-go all round' in the area of unlawful dismissal. It introduces a fair and simple process that clearly establishes the rights an responsibilities of employees and employers. The QIRC/AIRC will decide whether a dismissal is harsh, unjust or unreasonable by considering the merits of the case and the process involved in the dismissal.

- The legislation gives limited protection for some forms of industrial action ('protected action') during agreement negotiations. At the same time, it provides for strict penalties for unprotected industrial action and other remedies for disobeying orders of the QIRC/AIRC regarding industrial action that is not protected.

Industrial action that is not protected action is subject to maximum penalties for companies and for individuals. Common law action can also be taken to recover damages from a person or organisation engaging in unprotected industrial action. This applies to both CAs and QWAs/AWAs and ensures that parties recognise their responsibility to abide by agreements they have freely entered into.

Industrial action taken during the term of a CA or QWA/AWA is not protected action.

6.5 TAXATION

The coal mining industry, as with all economic entities operating within Queensland, is subject to a State taxation regime, the principal elements of which are as follows.

Payroll Tax

Employers whose group annual payroll tax bill exceeds $3.2 million are subject to payroll tax at the rate of 5%.

Employers with an average group payroll below $800,000 are exempt from payroll tax.
Within the $800,000 to $3.2 million band, the rate of payroll tax "ramps up", from 0% to 5%. The ramping up mechanism comprises a deduction of $800,000, less $1 for every $3 by which the annual payroll exceeds $800,000. No such deduction is allowed for an employer whose annual payroll exceeds the $3.2 million.

In practice, the threshold and "ramping up" arrangements provide relief for small employers, with the $800,000 threshold exempting many (95% of all employers) from payroll tax entirely.

However, almost all coal mines in Queensland would be expected to have an annual payroll in excess of $3.2 million (including those operated by contractors). Accordingly the expected rate of payroll tax payable by a coal miner is 5% of the payroll.

It is pertinent to note that Queensland's 5% rate of payroll tax is substantially less than the 6.85% applied in New South Wales (NSW also has a much lower tax threshold of $600,000).

Stamp Duty

Stamp duty is applied on a wide variety of instruments and transactions including, for example:

- Transfers of real property and marketable securities;
- Acquisitions of businesses;
- Mortgages, leases, insurance policies and loan agreements; and
- Application for motor vehicle registration and transfers of registration.

The rate of stamp duty and the basis on which it applies varies with the type of instrument or transaction involved. The principal areas of State revenue generation are, however, property conveyances, motor vehicle registrations and transfers, other insurance, and mortgages.

Stamp duty is not expected to impact materially on the day-to-day operation of a coal mine.

6.6 MAJOR PROJECT FACILITATION

To assist in the delivery of sustainable economic development and jobs growth in Queensland the Government, though the Department of Economic Development and Trade, maintains a major project facilitation process.

The Department assesses and facilitates major projects and ensures an effective whole-of-Government response to project proponents. The Department is also actively involved in identifying Government approvals and infrastructure requirements; monitoring Impact Assessment Studies; facilitating negotiations of required State, Local and Commonwealth government requirements; and assessing and monitoring Native Title claims.

The Department also ensures due process is followed and that the project meets the reasonable expectations of the State, proponents and the community, and that the project risks are appropriately managed.

Activity is focused on major projects which generally have one or more of the following characteristics:

- Strategic industry or regional development significance;
- Investment exceeding $50m;
- Multi-department requirements; and /or
- Inter-governmental issues.

Major coal projects clearly meet most of these characteristics and a number of coal projects are currently being facilitated.

The Department of Mines and Energy has sole responsibility for administering exploration and mining tenure and is the lead agency within Queensland for all mineral and energy sector issues. Interaction with other Queensland Government agencies will be required from time to time during the mining lease application stage, with approvals required from organisations such as the Water Resources Commission or the Department of Environment. Specific infrastructure issues may be dealt with by Queensland Transport, Queensland Rail or Ports Authorities, the Departments of Main Roads and Local Government and Planning, in conjunction with other relevant government agencies.

6.7 SURAT BASIN PROCESS

Total identified coal resources in the Surat Basin/Dawson Valley are about 4 billion tonnes. The Surat Basin coals are typically perhydrous, have high volatile matter content and moderate ash and are suitable for steam-raising. These coals are very well suited to hydro-liquefaction. The Dawson Valley coals lie in the southern Bowen Basin and are low ash, high volatile matter content coal well suited to the current export market.

In October 1996 the Government advertised in Australia and around the world via the internet for expressions of interest from the private sector for the financing, construction and operation of infrastructure required to support development in the Surat Basin and Dawson Valley Region.

The Government's information package calling for expressions of interest states, inter alia, that it is the Government's strong preference that proponents develop commercial infrastructure proposals which do not require any Government assistance and support and involve the proponent bearing the normal commercial risks attendant upon ownership of infrastructure. The information package states that preference will be given to proposals requiring no (or little) Government assistance and support.

However, the extent of private sector ownership and operation of infrastructure will ultimately be determined by the nature of the proposals submitted by industry and the degree to which the Government's strategic, economic and commercial objectives are satisfied by proponents.

Commercial in confidence considerations preclude the release of details on the 20 expressions of interest received. However, they range from integrated proposals incorporating the construction of a mine, dam and railway line to single item infrastructure proposals.

All proposals received were assessed against the already announced assessment criteria.

On 29 October 1997 the Government announced a short list of private enterprise proponents, and proposals, for the development of a new dam, new rail systems and new power stations. The Government believes that the short listed proposals have the potential to be developed into commercially viable infrastructure projects worth an estimated $3 billion and capable of creating at least 3,000 direct new permanent jobs in the region.

6.8 INFORMATION PROVISION

The Queensland Department of Mines and Energy provides information on the State's coal resources, including access to an extensive open-file library of coal company exploration reports, details of current coal tenements, geological maps, drill bite information and drill use. The Department also maintains complete statistics on the Queensland coal industry and publishes the annual Queensland Coal Industry Review and produces the comprehensive technical report on Queensland Coals, Physical and Chemical Properties, Colliery and Company Information.

As well as general information provision the Department has an extensive knowledge of Queensland coal resources and coal deposits. The Department is responsible for administration of coal exploration and development throughout the State and actively seeks to facilitate further development.

The Q*THERM* Program within the Department of Mines and Energy is designed to promote greater awareness in the international marketplace for Queensland thermal coals and demonstrate

Queensland's willingness and ability to respond to greenhouse and other environmental issues with respect to coal utilisation. Q*THERM* receives advice on its activities from a Q*THERM* Industry Reference Group.

The Program was implemented in 1994-95 for a three-year term and in the Queensland State Budget of May 1997 was extended for a further three years to end of June 2000.

Q*THERM* maintains and markets a computer database of all Queensland coals and undertakes or commissions investigations into utilisation of Queensland thermal coals. The database, maps of Queensland coals, technical reports, summaries of investigative results and other products are distributed world-wide. Consumers are able to search the database on any combination of specific coal quality parameters to find Queensland coal brands to suit their needs. The summaries of investigative results have been translated into Japanese, Korean and Mandarin for Asian markets and are currently being translated into German and French for the growing European markets. These translations are also incorporated into the Q*THERM* internet website http://www.dynamics.com.au/qtherm.

Q*THERM* has recently produced two technical reports, prepared by Energy Tactics, on the utilisation of the lower volatile thermal coals from the Bowen Basin and the use of low volatile coals in the international pulverised coal injection (PCI) markets.

The Queensland Government, through the Department of Mines and Energy, is a participant in the Co-operative Research Centre for Black Coal Utilisation Research Centre at the University of Queensland.

In addition, the Queensland Department of Mines and Energy has two reports being prepared which may be of interest to the Industry Commission.

Q*THERM*, the Queensland Government thermal coal promotion program, has commissioned a report by Lindsay Juniper of Ultra-Systems Technology Pty Ltd, on the competitiveness of Queensland thermal coals and competitor coals on the basis of coal specifications, utilisation characteristics, value analysis and market differentiation (i.e. it will be based on coal quality parameters and utilisation performance). Q*THERM* plans to use data from this report to promote the advantages of Queensland thermal coals.

In addition, two officers from the Department will attend the Fifth Annual Technical Seminar of the APEC Experts' Group on Clean Fossil Energy in Reno, Nevada, October 27-30, 1997, and will also visit coal mining areas in Colorado and Utah, as well as the export facilities in Los Angeles. These officers will be reporting to the Department on aspects of the US coal industry.

Both of these reports are expected to be available by mid-December, 1997. If the Industry Commission is interested in obtaining a copy of these reports the Department would be pleased to supply them when they become available.

6.9 REGULATORY REGIM E

6.9.1 Economy wide

The general regulatory framework which governs the market in Queensland consists of:

- The *Trade Practices Act* which applies to both the public and private sector;

- Corporations law and (in the case of Government owned corporations such as QR and the port authorities) the *Government Owned Corporations Act*; and
- The *Queensland Competition Authority Act*.

This general framework is designed to ensure that:

- All participants in the market are subject to the same competitive conduct rules
- There is effective competition in contestable markets; and
- Where contestability is not feasible (i.e. because of the existence of a natural monopoly as in the case of infrastructure), there is effective regulation of monopolies to ensure that market power is not abused.

Essentially, the regulatory framework is designed to ensure that the market operates as freely as possible (without any participant having any regulatory advantage) and that arrangements are left as far as possible up to commercial negotiation.

In this regard also, the *Coal Industry (Control) Act 1948* and Orders made under that Act are to be repealed. This legislation contained a range of essentially "reserve powers" relating to the regulation of the industry by the Queensland Coal Board, most of which are currently dormant and have been for some time (including, for example, powers to compulsorily acquire coal, to regulate prices for the sale, purchase or resale of coal and to regulate the opening, closing and abandonment of coal mines). There was only one identified "live" restriction, namely certain Orders issued under the Act requiring certain users of coal to only purchase from specific coal mines (but which relates only to three small mines in the South-east of the State and therefore does not affect the major export coal mining operations).

6.9.2 Exploration and mining tenure processes

Legislation/Policies

Exploration and mining in Queensland is administered and regulated via the *Mineral Resources Act 1989* (MRA) which was passed by Parliament on 25 October 1989 and provides for the assessment, development and utilisation of mineral resources to the maximum extent practicable, consistent with sound economic and land use management.

The MRA simplified the range of tenure types. There are now essentially three types of Exploration/Retention tenures (Prospecting Permit, Exploration Permit and Mineral Development Licence) and two types of Mining tenures (Mining Claim, Mining Lease). Of these only the Exploration Permit (EP), Mineral Development Licence (MDL) and Mining Lease (ML) are commonly used by the coal industry. Also, the environmental regulation of the industry is conducted through a number of environmental protection and resource management Acts, e.g. Environmental Protection Act, Mineral Resources Act and Water Resources Act.

The *Environmental Protection Act (1994)* requires operators of coal mines to hold an environmental authority for the mining activity and various other
environmentally relevant activities conducted on a coal mining project.

Currently, the State Government, in consultation with stakeholders, is reviewing the environmental regulation of the mining industry and preparing an Environmental Protection Policy as subordinate legislation under the Environmental Protection Act. The aim is to rationalise and integrate the

current regulatory regimes under various Acts to provide a more effective and efficient regulatory regime that promotes progressive improvement in the environmental performance of the mining industry.

Exploration Permits are the forms of tenure which allow large scale, intensive exploration to be conducted. An EP has a maximum term of 5 years including renewals. During this time the holder can prospect, explore and determine the existence of coal or minerals using the necessary equipment to sample and test as required. Applications must be lodged with appropriate supporting documentation outlining the work to be conducted and the resources committed to this work. All work conducted on the Permit must be regularly reported to the Department. Land contained within an EP may have to be relinquished from the Permit as it is found to be non prospective. The Permit can be surrendered or assigned by the Holder.

Mineral Development Licences are used to evaluate the technical and economic potential of an identified mineral resource while providing the necessary security of tenure. In many cases the title may be used as a form of retention tenure in which no work may be conducted but tenure over the area is retained by the holder until a time when mining can be progressed. An MDL can be granted for up to 5 years and may be renewed for further periods.

Mining Leases when granted allow mining operations to be undertaken. A Mining Lease may be granted with no surface area, part surface or all surface area depending on the type of activities to be undertaken. An ML will be granted for a particular mineral(s) and to permit specified activities. The lease application process for coal and oil shale related activities may take from 6 to 15 months to complete depending on the environmental processes to be conducted before grant. These processes will include the submission of an Environmental Management Overview Strategy (EMOS) and may include the preparation of an Environmental Impact Statement (EIS). Any objections to the grant of an ML will be held in the Wardens Court. Grant cannot take place until compensation with land owners has been determined. The lease will be granted for an appropriate term subject to determined conditions. Operations cannot commence on the lease until an approved Plan of Operations has been submitted. Lodgement of an appropriate security deposit will also be required.

The fees, rents and security deposits required for the administration of these tenures varies with tenure type. Methods of calculation and the relevant timeframes should be clearly understood by the applicant/holder.

The normal path for exploring, developing and mining a deposit is to initially obtain an Exploration Permit (EP) which enables exploration over a prescribed area (described by degrees of latitude and longitude in sub-block units of one minute by one minute). If a deposit is defined, the explorer can subsequently apply for a mining lease over all or part of the area as the economic potential is proven and the decision to develop a mine taken. It may also be useful in some cases to go through the intermediate step of obtaining a Mineral Development Licence (MDL). For instance, if exploration is complete, but for technical or commercial reasons mining cannot take place or is not timely, the deposit can be held in this intermediate form title. Development work such as marketing, feasibility studies and bulk sampling can be undertaken using this title.

The Department has developed policies over the past 2-3 years to provide a consistent and clear interpretation of the MRA. These policies have been developed where appropriate with consultation from various interest groups. After approval by the Minister the documented policies have helped to improve the consistency of tenures administration and clarify the obligations and rights of tenure holders. Policies relating to coal and oil shale tenures have been documented and

published along with guidelines to assist potential explorers and developers in Queensland (Department of Minerals and Energy, 1994).

The Department has been delegated the role of an administering authority for the regulatory provisions of the Environmental Protection Act enabling the issue of environmental authorities concurrent with granting of tenures.

Tenure Processing Times

Routine applications for tenures are processed in accordance with Department policies within agreed target times. These targets include average processing times of:

- EPs - 20 days for presentation of an offer
- EPs - 40 days for grant
- MLs - six months to nine months with no EIS and
- 15 -18 months for mining leases where an EIS is required (times vary according to the size of the project and commodity).

These processing times ensure that applicants can gain access to land within realistic time periods and compare very favourable with other States.

Quality Assurance

The Department is currently documenting its tenure processing systems with a view to improvement. The Department has a strong commitment to gaining certification to the AS/NZS ISO 9002 Quality Standard by developing and implementing a Tenures Quality Management System. Certification is planned to occur by 31 May 1998.

The develop of the a quality system and meeting the Quality Standard will include:

- Increased client focus.
- Increased client satisfaction through improved consistent service.
- More confident, informed and satisfied staff.
- An ability to improve the system through regular review.
- External recognition of a certified “Quality Assurance” system.
- Ability to benchmark.
- Less exposure to risk associated with errors.

Native title

The Queensland government has implemented administrative procedures to enable tenure processing and other dealings to proceed as much as possible following a consideration of native title impacts and in compliance with the requirements of the *Native Title Act 1993* (NTA).

New tenures are proceeding over all freehold land. Assessments of the land tenure and land use history are done for all other land tenure types. The Queensland government is awaiting the Commonwealth Parliament’s deliberations on the Native Title Amendment Bill 1997. If the Bill is passed in its present form it will then further amend our mining tenure procedures and the *Mineral Resources Act 1989* to implement Alternative Provisions to the right to negotiate process under the NTA to provide the same procedural rights to indigenous people as for land holders under the Act.

There have been a number of native title claims lodged over the Bowen Basin coal deposits and the shale oil deposits west and south west of Gladstone. Included in these are claims QC97/28 (Garingbal & Kara Kara people), QC97/31 (Wiri/ Yuwiburr/Birria/Jangga people), QC97/40 (Ngaro/Gia/Wiri/Yuwiburra/Birria people), Bailee claim (QC97/29) and the two Wulli Wulli claims (QC97/25, 26 and 38). The claims cover large areas of land in the Shires of Banana, Bauhinia, Belyando, Bowen, Calliope, Charters Towers, Emerald, Gladstone, Mackay, Mirani, Nebo, Peak Downs, and Sarina.

6.10 ENVIRONMENTAL I SSUES

6.10.1 Planning and approval

Planning for coal mine development is conducted under the *Mineral Resources Act 1989* (MRA) rather than the *Local Government (Planning and Environment) Act 1991* which is the main planning legislation in Queensland. However, new legislation, to be called the Integrated Planning Act, is currently before the Quensland Parliament. This Act will replace the *Local Government (Planning and Environment) Act 1991* entirely. The MRA requires the applicant for a mining lease to include in the application information that: describes the land, identifies any erosion control works, identifies improvements that would restrict use of the land, identifies access routes, identifies the proposed purpose of the lease, outlines the mining program, states the infrastructure requirements, details the applicant's financial and technical resources, and describes (in a document known as an environmental management overview strategy or EMOS) strategies for protecting the environment, managing environmental impacts and rehabilitating the land.

A period of at least 28 days is allowed for objections to the grant of the lease. This period commences on the day that a certificate of application is issued by the Mining Registrar signifying that the applicant is eligible to apply for the lease and the application complies with the requirements of the MRA.

At any time during this objection period, the Minister may request that an environmental impact statement (EIS) be prepared. This decision is based on a set of criteria contained in a Department of Mines and Energy (DME) publication titled *Environmental Impact Assessment and Management for Mining in Queensland 1995*. The draft guidelines for an EIS would be prepared by the DME in cooperation with Advisory Bodies which are other relevant government agencies and non-government organisations. The EMOS would contain commitments to implement environmental controls and measures to mitigate environmental effects identified in the EIS. In most cases an EIS is not required, however Advisory Bodies would be selected and consulted on the draft EMOS. For some major projects where mining was only a component of the project, the impact assessment process might be coordinated by the Department of Economic Development and Trade under the *State Development and Public Works Organization Act 1971*.

Compensation agreements between the applicant and the owners of the land which is subject to the application must be determined before a mining lease can be granted

Should there be any objections to the grant of the lease or disagreements about the compensation offered, a hearing would be held in the Warden's Court. This cannot commence until any study into the environmental effects of the proposal is completed. The Warden may make

recommendations to the Minister regarding whether the application should be granted or rejected in part or completely. The Minister must consider the Warden's recommendations and approve the EMOS before making a recommendation to the Governor in Council that the mining lease be granted. The Minister may reject an application and then must give reasons to the applicant.

The process of assessment and deciding an application for an environmental authority to conduct environmentally relevant activities on a mining project occurs concurrently with the tenure process. The applicant has a right of review and appeal to the Planning and Environment Court in regard to a number of decisions made under the Environment Protection Act.

6.10.2 Operational controls

All mining leases are subject to a number of conditions. Those which relate to environmental management require the holder: to submit a Plan of Operations consistent with the EMOS, to conduct mining activities in accordance with the EMOS and current Plan of Operations, to submit an environmental audit with any plan of operations, to remove any buildings or equipment prior to the lease terminating, to submit any reports or statements, to pay agreed compensation, and to deposit any security required by the Minister to ensure that the holder complies with the lease conditions and the MRA and rectifies any actual damage caused to the land or improvements.

The EMOS would normally contain a description of the project, a list of environmental impacts and commitments on how the impacts will be controlled, and an overview strategy describing environmental management programs and control processes throughout the duration of the lease. The impacts typically are grouped under the following headings: land resources, water resources, noise, air quality, conservation values, heritage and cultural values, social, research and environmental monitoring.

The initial Plan of Operations must be submitted to the Minister at least 2 months before starting operations under the lease. It must be accompanied by an environmental audit statement regarding the plan's consistency with the EMOS for the lease. The plan may cover a period of up to 5 years.

The security must be lodged before the holder commences operations under the lease. The amount is calculated on the basis of the maximum actual cost to rehabilitate the land that is disturbed at any time within the duration of the Plan of Operations. There are discounts available which range up to 75% depending upon which performance category the operation has achieved. Implementation of the security requirements was phased in over a ten year period for coal mines in existence when the security system commenced in June 1992, commencing with 10% of the discounted amount in 1992-93 and increasing 10% each subsequent year. This was to take account of the large scale of many operations and the substantial areas of incomplete rehabilitation. These older mines are currently paying 60% of the discounted amount of security.

The company develops the EMOS commitments and once they are accepted, the company is responsible for implementing them. The DME conducts a program of Compliance Assessments to check that companies are complying with their EMOS and Plan of Operations.

A number of environmentally relevant activities such as storing large amounts of fuel or chemicals, mineral processing, smelting and power generation require licensing under the *Environmental Protection Act 1994.* The DME has a delegation from the Department of Environment to administer this Act in relation to these activities (not power generation) when they occur on a mine site. An Environmental Protection Policy for Mining is being prepared under that Act to streamline the approval process and remove duplication.

6.10.3 Rehabilitation

The EMOS must state strategies for progressive and final rehabilitation. The amount of progressive rehabilitation is a decision for the company and will depend on the nature of the operation, waste disposal facilities, future mining plans and financial considerations. To encourage rehabilitation, the amount of security required is reduced when rehabilitation is completed. There are additional financial incentives to carry out progressive rehabilitation as the environmental performance category is raised if the planning has been completed to the extent that adequate supplies of soil and other materials for rehabilitation have been identified; adequate financial and technical resources are available; and an even greater rebate is available if progressive rehabilitation has been carried out (provided other environmental controls such as water management systems are in place). After applying the rebate corresponding to these performance categories the company would be required to lodge only 85 to 40% of the calculated security.

The objective of the final rehabilitation is to leave the mined area with a landform and surface characteristics that will have the capacity to support the agreed future land use which would either be similar to the pre-existing land capability or some other agreed beneficial use. The land form must be stable so that it either is self sustaining or management requirements are agreed. Surface and groundwater that leave the mine area must be of an acceptable standard both during and after mining.

A lease would not be terminated if there were unfinished rehabilitation requirements. If the lessee abandoned the lease or the lease expired without rehabilitation being completed, part or all of the security deposit may be used to rehabilitate the site.

There were few environmental considerations in the late 1960s when coal mining activity increased markedly in Queensland. The Mining Act 1968 introduced "sludge abatement" provisions which required the tenement holder to prevent mineralised or impure water or sludge from polluting, obstructing or interfering with any water body. The Act gave the Minister discretion to require the holder to provide works to impound or treat these pollutants. The Minister also had discretion to require levelling the surface and restoring land to as near as possible to its original state. A number of coal mines were subsequently required to obtain licences under the *Clean Waters Act 1971*. Much of the mining in the 1960s and 1970s was poorly planned and little rehabilitation was conducted. By 1989, more than 30,000 hectares had been disturbed by coal mining and about 5,000 hectares had been rehabilitated.

The *Mineral Resources Act 1989* introduced a more integrated environmental management approach to mining. The Act required all mining lease applications to include a strategy about progressive and final rehabilitation. A Departmental policy was introduced in 1992 which provided an incentive to rehabilitate the land through reduced security deposit requirements. Rehabilitation rates increased from approximately 500 hectares per year in 1991 to 1700 hectares in 1994-95. The rate at which land was disturbed also increased as new mines were opened. By 1995-96 a total of 47,500 hectares had been disturbed and 10,000 hectares had been rehabilitated, ie. about 37,500 hectares were unrehabilitated.

The cost of rehabilitation varies from less than $5,000 per hectare for areas where disturbance has been slight such as roads, to about $25,000 per hectare for waste dumps, and may exceed $30,000 per hectare for difficult areas. The total cost of rehabilitating existing coal mines has been estimated

at approximately $600 million. This is an acknowledged liability that will be met by the mining companies during the life of the existing mines.

There have been few environmental issues at the major coal mines in recent years although several Orders to Comply have been issued in relation to defective water management systems. A number of complaints have also indicated dust and noise issues which have been investigated.

6.11 GREENHOUSE POLI CY

6.11.1 Background

In 1992, the National Greenhouse Response Strategy was developed in response to Australia meeting its obligation to reduce greenhouse gas emissions, to 1990 levels by 2000, under the terms of the United Nations Framework Convention on Climate Change.

The original Strategy was based on a 'no regrets' approach to mitigate greenhouse gas emissions, with 'no regrets' measures defined as:

> "Measures which have financial, social and environmental benefits to the community at large, in addition to reducing greenhouse gas emissions, and which, over time, are sufficient to outweigh the direct and indirect costs associated with the measure".

The Strategy was designed to reduce emissions without reducing Australia's international competitiveness or resulting in net adverse economic impacts.

A review of the Strategy commenced in 1996 and is almost complete.

6.11.2 The International Situation

Negotiations to strengthen the Framework Convention on Climate Change, via a protocol or another legal instrument, are due for completion by the Third Conference of the parties, due to be held in Kyoto, Japan, 1-10 December 1997.

While it appears that most developed countries favour the introduction of a uniform and legally binding target for reducing greenhouse gas emissions to apply equally to all Annex 1 signatories to the FCCC (the developed countries including Australia), Australia is opposed to such an approach calling instead for the development of differentiated targets based on each country's circumstances.

The Australian position is based on the following premises:

- Uniform targets for reducing emissions are inequitable because such a measure would impose disproportionately higher costs upon countries with highly fossil fuel dependent economies;
- Uniform targets are economically inefficient, as cuts in emissions will not be made on the basis of least cost; and
- Differentiated targets should be set for countries according to GDP growth, population growth, the emissions intensity of GDP, fossil fuel trade, and emissions intensity of exports.

However, while the Australian arguments for differentiated targets have a sound and logical base on the grounds of both equity and economic efficiency, most developed countries appear to believe that the issue of differentiation is too complex for this phase of the negotiations, and as a result support the establishment of a uniform and legally binding target.

6.11.3 Beyond Kyoto

Preliminary analysis indicates that there will be a negative impact on the Queensland economy if Australia endorses the new agreement likely to be negotiated in Kyoto. The extent of the impact will depend on the size of the global targets negotiated.

Irrespective of whether Australia endorses the new agreement likely to be negotiated at Kyoto, if the international community endorses a new agreement to reduce greenhouse emissions, there are likely to be adverse impacts on Australia's coal exports in response to changes in the world energy markets. These impacts will be determined by:

- The extent and nature of the targets;
- The extent to which companies transfer their operations from Annex 1 to non-Annex 1 countries ("carbon leakage");
- The extent to which countries engage in fuel switching away from coal as a result.

The expected impact will depend on coal type and will vary from market to market. However, "carbon leakage" is in fact expected to lead to new opportunities for the coal industry.

Japan could seek to meet a target for reducing greenhouse gas emissions by reducing coal consumption, possibly by moving energy intensive industry off-shore to South-East Asia. Japan could also seek to reduce the consumption of thermal coal consumption by switching to other fuels including liquefied natural gas and uranium.

The European Community accounts for 18% of Queensland's coal exports, predominantly coking coal, although exports of thermal coal have been increasing in recent years as countries seek to replace poor quality domestic coals with high quality Australian coals. While the market for coking coal could contract if there was a further contraction in the European steel industry in response to moves to reduce emissions, Queensland's share of the thermal coal market could conceivably continue to grow.

Excluding Japan, the Asia-Pacific region accepts over 32% of Queensland's coal exports. Most of these countries, with the possible exception of Korea, are likely to remain free of requirements to reduce greenhouse gas emissions. If the agreement results in "carbon leakage", in the short to medium term, new markets are likely to emerge for Australian coals in our near neighbours in Asia. The promotion of Australia's clean coals (low sulphur) and development and promotion of clean coal technologies could also assist in securing new, and maintaining existing markets in the region.

- As noted previously, Queensland coal exports to Asian countries have increased significantly over the last decade and are forecast to continue to increase over the next decade.

If, as currently appears likely, Australia fails to win support for differentiated targets, the choice for Australia is to agree to a uniform international target or to remain outside the agreement. The latter would raise a risk of retaliatory action by Annex 1 countries. The extent of this risk is debatable. However, it is expected that any such measures would not be introduced through the Framework Convention on Climate Change, but be introduced unilaterally. It is also expected that the severity of such measures that could be introduced would increase over time. One potential target of such punitive measures are coal exports, with the growing European market for thermal coals thought particularly vulnerable.

Signing the new agreement at Kyoto is not expected to lead to any restrictions on coal exports as no such restrictions have been mooted at any time during the negotiations to strengthen the Framework Convention on Climate Change. Indeed, signing at Kyoto should remove any threat to Queensland's export trade beyond the changes that will occur in world energy markets if an agreement is reached at Kyoto. However, other industries such as resource processing could be adversely affected, consistent with the preliminary analysis that there will be a negative impact on the Queensland economy if Austrlia is a signatory to any agreement at Kyoto (the extent of the impact depending on the size of the global targets agreed).

However, if Australia signs an agreement at Kyoto, there will be a need for Australia to pursue a reduction in greenhouse intensity of Australian energy consumption, as part of a broader strategy to reduce emissions. This reduction in the greenhouse intensity of Australia's domestic energy supplies could be encouraged by the introduction of a system of tradeable emissions quotas which is likely to be established in the wake of an agreement at Kyoto.

Thus while coal currently enjoys a clear economic advantage over other fuel sources for base load power generation, moves to reduce greenhouse gas emissions could see this cost advantage eroded over time should a system of tradeable permits be introduced. Under such a scenario:

1. In the short term, the market share of coal for electricity generation could fall in response to limited fuel switching and the utilisation of renewables such as bagasse, with little impact on the total quantities of coal being used. Indeed under such a scenario demand for coal could continue to increase over the next few years;
2. In the long term, there is some potential for the total market for coal for electricity generation to decline more significantly in response to large scale fuel switching, including the development of cost effective renewable energy sources.

The extent to which pressure will be brought to bear upon the electricity industry to reduce emissions will depend in part upon:

- The targets agreed to at Kyoto;
- The extent to which Governments move to meet any targets by ensuring that all sectors, including sink enhancement, play their part in reducing emissions; and
- The cost effectiveness of emissions reductions.

The development and promotion of clean coal technologies could serve to reduce the pressure on the electricity industry to switch away from coal, and could serve as a springboard for exports into developing countries.

6.12 RESEARCH - CLEA N COAL TECHNOLOGY

The Queensland Government, through the Department of Mines and Energy, is a participant in the Cooperative Research Centre for Black Coal Utilisation (or Black Coal CRC) and through Q*THERM* supports the Queensland Coal Utilisation Research Centre at the University of Queensland.

As greenhouse emission controls come into effect, calls for environmentally acceptable coals and appropriate clean coal technologies will escalate. Due to its economic advantage and reliability of long-term supply, coal will continue to be the dominant fossil fuel for electricity generation with a growing demand for thermal coals.

The Q*THERM* Program has been conducting trials on the utilisation of Surat/Moreton Basin Walloon coals and has participated in the successful testing of one of these coals in an air-blown pressurised fluidised bed gasifier with simulated gas turbine power generation process at HRL Technology's laboratories in Victoria.

The Black Coal CRC is setting up a pressurised entrained flow gasifier/reactor research facility at the Queensland Centre for Advanced Technologies in Pinjarra Hills near Brisbane. The facility will be built and operated by the CSIRO Division of Coal and Energy Technology. The Queensland Minister for Mines and Energy has contributed directly toward the capital cost for this facility. Construction is expected to be completed in 1988 and a three-year test program will follow. The facility will incorporate provision to use steam as well as oxygen as a reactant. The rig will not be a pilot plant as such but rather a research tool to generate conditions found in a number of such advanced coal utilisation technologies.

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APPENDIX I

TERMS OF REFERENCE

APPENDIX II

COAL RESOURCES IN QUEENSLAND

Thermal coal resources

The expected market for increasing demand for thermal will require high and medium to high volatile thermal coals of low sulphur content with a Hardgrove Grindability Index >45. Queensland has 857 Mt of resources amenable to open cut mining of premium **high volatile** coal of >30% volatile matter content and additional resources suitable for underground mining of 1,995Mt. These resources support present mining operations and will also sustain future coal mine developments of Bowen Basin deposits including Gordonstone, Dawson/Theodore, Valeria, Minerva and Taroborah. Further exploration is likely to establish additional resources at Cullin-la-ringo and Gindie.

In the **medium to high volatile** class (25% to 30% (adb)) , Queensland has known resources of 6,114Mt of which 1,256Mt are amenable to opencut mining. The mine/deposits containing these coals include Blackwater, Blair Athol, Clermont, Eastern Creek, Ensham, Havilah, Moura, Newlands, Rolleston, Rugby, South Blackwater, Suttor Creek, Togara North and Togara South.

Demand for **lower volatile** thermal coals is weaker although these coals have been demonstrated to be desirable for direct injection into the blast furnace (PCI) in iron making. Sales are also made in the industrial market mainly for cement manufacture. These high energy low volatile coals may become subject of further demand for utilisation in new and emerging power generation technologies such as pressurised fluidised bed combustors and gasifiers subject to acceptable reactivity properties. 4,410Mt of lower volatile high energy coals occur in deposits which are mainly located north of the central railway (Blackwater Line) in the Bowen Basin. These contain coals which range in rank from medium volatile bituminous to anthracite and include resources of 1,303Mt which are amenable to opencut mining. The major known deposits that are amenable to opencut mining are Daunia, German Creek East, Jellinbah East, Kemmis-Walker, Lake Lindsay, Lake Vermont, Poitrel, South Walker Creek, West Nebo and Winchester South. In addition, a number of smaller deposits are known and there is also potential for discovery of additional large resources in this category, both in the northern sector of the Bowen Basin and the region from Bluff to Baralaba.

There are very large resources of highly reactive, **high volatile, perhydrous** thermal coals in the Surat and Moreton Basins which have yet to be developed. These amount to some 5,329Mt of raw coal insitu at depths amenable to opencut mining. Of this tonnage 2,708Mt occur in shallow deposits in the Surat Basin. The coals are suitable for both domestic and export markets for utility power generation and the industrial market including use in small coal fired boilers. The economic viability of coal mining operations will be determined to a great extent by coal handling and transport costs. This coal is of lower energy content than the premium energy thermal coals of the Bowen Basin and accordingly will attract lower prices. The development of new mines should be assisted by the establishment of appropriate infrastructure and demonstration of the excellent combustion and environmental performance of these coals. At the present time only one mine (Wilkie Creek Mine) is operating in the Surat Basin. The Moreton Basin resources currently support operation of three mines at Ebenezer, Jeebropilly and Oakleigh in the Amberley - Rosewood district to the west of Ipswich.

There are large resources of somewhat lower grade thermal coals in Queensland that are currently utilised for domestic power generation. Whilst adequate for domestic purposes the quality is not acceptable in the export market generally because of the lower energy content or relatively high ash content. The resources of opencut mining potential amount to some 666Mt in the Callide Basin with a further 692Mt in the Tarong Basin.

In addition there are large undeveloped resources of relatively low rank bituminous coals in the remote Galilee Basin of mid-western central Queensland. Whilst a low grade export product could be prepared from the southern deposits near Alpha and Kevins Corner, transport and infrastructure costs render them uneconomic. Generally the remaining resources are not of export quality but would be suitable for domestic use as energy coals use if local demand could be established. Known resources amount to 2,218Mt that are amenable to opencut mining with a further 530Mt accessible by underground mining methods. The most northerly known deposit containing 645Mt, occurs at Pentland near the railway west of Townsville.

Coking coal resources

Queensland coking resources that are amenable to opencut mining amount to 2,343Mt with a further 10,009Mt accessible by highwall underground and conventional underground mining methods.

The coking resources with opencut potential are very limited, 292Mt for the higher volatile (>26% VM) types, with the bulk of this coal located within the Gregory, Oaky Creek and Moura mining leases. Substantial resources of 3,548Mt are accessible to underground mining and provide the resource base for relatively new longwall operations at Gordonstone, Crinum, Oaky Creek and Moranbah North.

The medium volatile coking coals (VM 20-26% adb) comprise some 1600Mt of resource that are amenable to opencut mining with a further 6,269Mt accessible to underground mining. The major deposits containing these resources are Blackwater, Burton, Curragh, Daunia, Goonyella, Grosvenor, Hail Creek, Moranbah South, Peak Downs - Saraji, Poitrel and Riverside.

The low volatile coking coals are principally found in the Norwich Park - Saraji deposits with a potential coking fraction available from Lake Lindsay. Known resources in the Bowen Basin amount to 890Mt of which 451Mt are amenable to opencut mining. Further exploration in the Peak Downs East region has potential to identify additional resources of low volatile coal for underground mining.

The medium to low volatile coking coals are competitive on a quality basis with the world's best, producing metallurgical cokes of low reactivity and high coke strength after reaction (CSR) values. They have become of increasing importance to steel mills using PCI because of the superior properties they confer to the coke. Blast furnace cokes of increasingly high mechanical strength, lower reactivity to CO_2 and increasingly high CSR values are required commensurate with increasing levels of PCI.

APPENDIX III

GRAPHS ON MINING PRODUCTION/EXPORTS

APPENDIX IV

CURRENT STATUS OF MINING PROJECTS

APPENDIX IV CURRENT STATUS OF COAL MINING PROJECTS

COMPLETED DURING 1996/1997

PROJECT	OPERATOR	TYPE	PRODUCTION	STATUS
South Walker Creek	BHP Coal Pty Ltd	Open cut thermal/PCI	1 Mtpa	Operating as a trial mine. If successful, will increase production to 3 Mtpa.
Burton	Portman Mining Pty Ltd	Open Cut coking/thermal	1.9 Mtpa	Announced in May 1997 that the mine would be expanding to double production to 4 Mtpa with a further $160m capital investment
Crinum	BHP Coal Pty Ltd	Underground coking	3 Mtpa	Longwall equipment commissioned June 1997
Kenmare	South Blackwater Coal Ltd	Underground coking	3 Mtpa	Longwall equipment commissioned November 1996

UNDER CONSTRUCTION

PROJECT	OPERATOR	TYPE	PRODUCTION	STATUS
Alliance Colliery (Oaky Creek)	Thiess/Namoi Joint Venture	Longwall retreat - highwall underground coking.	1.5 Mtpa	Sub-leased to Thiess/Namoi JV. Committed 1997. Highwall equipment procured. 2 panels directly off highwall. German Creek seam 2 m thick.
Moranbah North	Shell Coal Australia	Underground longwall coking	3.5 Mtpa	Driftage coal being stockpiled. Longwall production expected mid-1999 .
Newlands U/G	NCA Joint Venture/ MIM	Underground thermal	3.0 Mtpa increase over existing operations, including Suttor Ck and Eastern Ck Nth	Longwall production due to commence in early 1999.
Oaky North (3 km N of Oaky No.1)	MIM Ltd	Underground longwall coking	300 000 tpa	Under construction. Three entries off highwall.
Ensham expansion	Ensham Resources Pty Ltd	Opencut thermal	3 Mtpa	Under construction.

COMMITTED

PROJECT	OPERATOR	TYPE	PRODUCTION	STATUS
Peak Downs expansion	BHP	Open cut coking	from 7 to 10 Mtpa	To be complete by 2001/02. Total proposed capital increase in Peak Downs and Saraji: $470m
Saraji expansion	BHP	Open cut coking	From 5 to 7 Mtpa	To be complete by 2000. Total proposed capital increase in Peak Downs and Saraji: $470m

PROPOSED

PROJECT	OPERATOR	TYPE	PRODUCTION	STATUS
Hail Creek	Pacific Coal	Open cut coking, some thermal coal	5 Mtpa	Extensive feasibility being undertaken. Commitment to be decided in late 1997. Production is tentatively targeted for 2000.
Nebo West	BHP Mitsui Coal	Opencut PCI / thermal	-	10,000 t bulk sample proposed to be taken from ML 70131. MDL 235 over remaining major portion is being assessed.
Theodore (previously called Theodore North)	Shell	Opencut and underground thermal	3.5 Mtpa	No commitment yet. Small opencut production could be followed by underground mining. Feasibility study in progress.
Coppabella	Macarthur Coal Pty Ltd; Queensland Coal Resources Pty Ltd; CITIC Australia Resources Pty Ltd	Opencut PCI / thermal	-	ML application lodged September 1997. Proponents have identified PCI markets.
Minerva	New Hope	Opencut thermal	800 000 tpa	ML application made September 1996. Bulk sample to be taken late 1996 completed March 1997. Possible production by 1998
Togara North	Savage, Mitsui, Mining, Korean JV	Underground thermal	3.0 - 7.0 Mtpa	ML application made September 1996. Construction could commence late 1997 with production from 1998
Eastern Creek Nth	NCA Joint Venture/	Open cut thermal	An increase of	Itochu has bought AGIP's and the banks' interests in NCA. MIM

PROJECT	OPERATOR	TYPE	PRODUCTION	STATUS
Suttor Creek	MIM	Open cut thermal	3.0 Mtpa over existing operations	recently purchased AGIP's 25% share and now owns 100% of Suttor Creek. Commencement could be in conjunction with the Newlands underground project.
Red Hill	BHP Coal	Underground (Moranbah C.M.) Opencut (Rangal C.M.)	-	Exploration drilling in progress.
Goonyella underground	BHP for CQCA	Underground coking	Up to 4.0 Mtpa	Commencement date unknown. Focus has moved from Ramp Zero to the Eureka proposed U/G area to the north.
Wards Well	BHP for BHP Mitsui	Underground coking	Up to 4.0 Mtpa	Would replace Riverside coal production after 2000, feasibility undertaken but no commitment Currently appraising low-cost entry into upper seam via box / slot cut and development of roadways to test geotechnical conditions.
Togara South	Ingwe Australia Pty Ltd	Underground longwall thermal	4.0 - 8.0 Mtpa	Pre-feasibility study completed. Full feasibility in progress. Production not likely until 2005.
Daunia/Poitrel	BHP for CQCA	Open cut thermal		Bulk sample now delayed. Commencement date unknown.
Grasstrees	German Creek	Underground coking coal	3.0 Mtpa?	Plans for further development (deeper) at Central have put this project on hold. Would replace dwindling production from O/C and U/G mines
Lake Lindsay	ARCO for Curragh Joint Venture	Opencut coking /thermal	1.0 Mtpa	No commitment yet.
Clermont	Pacific Coal Pty	Opencut thermal	Up to 13 Mtpa	Will phase in as Blair Athol production decreases. Mine construction could commence from 2000, with coal production from 2004?
Dawson (Theodore South)	Shell Coal Pty Ltd	Opencut & underground thermal	Up to 3.5 Mtpa	Development depends on extension of Moura rail line.
Valeria	Pacific Coal Pty	Opencut thermal	5.0 Mtpa?	No commitment Coal production not likely until 2000-2005?

APPENDIX V

DESCRIPTION OF PORT FACILITIES

COAL HANDLING PORTS IN QUEENSLAND

PORT OF ABBOT POINT

The port of Abbot Point is located 20 kilometres north of Bowen. It was developed as a dedicated coal port, with a single terminal handling products from coal mines at Collinsville and Newlands.

Coal inbound into the terminal

Coal is railed to Abbot Point in diesel hauled trains with a total capacity of 4700 tonnes. Coal is unloaded through a bottom dump station and moves by conveyor to the 1.2 kilometre long stockpile area.

The stockpiles are served by two stacker/reclaimers. These rail-mounted machines operate along the stockpiles, stacking coal from a boom and reclaiming by rotating bucket-wheel. The stacker/reclaimers can be used to blend coal.

The stockpile system provides for both "live" coal, i.e. in direct reach of the stacker/reclaimers, and "dead" coal, i.e. bulldozed away when stacking and back within reach of the bucket wheels when reclaiming.

Total storage capacity at the Abbot Point Coal Terminal is 1.25 million tonnes. The amount of coal in the stockpile is managed by the mine who schedule the train to move the coal from the mine to the stockpile.

Coal outbound from the terminal

The conveyor system extends along a 2.8 kilometre approach trestle, which also supports a roadway, to the offshore deepwater wharf and shiploader.

The wharf and berth can accommodate ships up to 200,000 dwt, which are loaded by a single shiploader.

PORT OF HAY POINT

The Port of Hay Point is located 38 km south of Mackay and was established as a dedicated coal port. There are two coal terminals at the port; Hay Point Service Terminal and Dalrymple Bay Coal Terminal.

Hay Point Services Terminal

The terminal is owned by Central Queensland Coal Associates and operated by Hay Point Services Pty Ltd. The terminal services the coal mines associated with BHP.

Coal inbound into the terminal

Coal is transported to the terminal in electric locomotive hauled trains with a payload of 7500 tonnes. The trains are split and the coal is unloaded by 2 tippler unloaders. The coal is dumped into hoppers and then transferred to the 2.5m tonne stockpile area. The amount of coal in the stockpile is determined by the mine.

Coal outbound from the terminal

Coal is recovered by stacker/reclaimers and travels along two conveyors for 1.9 km to the two offshore berths, each of which have a shiploader.

One berth has a capacity to load ships of up to 230,000 dwt, while the other berth can load ships up to 180,000 dwt.

Dalrymple Bay Coal Terminal

Dalrymple Bay Coal Terminal Pty Ltd was formed to manage, operate and maintain the terminal on behalf of its shareholders, who are all of the mine owners, utilising the terminal. The owner of the terminal, the Ports Corporation of Queensland, licenses the use of the terminal to the operating company, which is entitled to charge unloading, stockpiling, and loading fees to the mine owners with capacity utilisation rights.

Coal inbound into the terminal

Coal is transported to the terminal in electric locomotive hauled trains with a payload of 7500 tonnes. The coal is unloaded through bottom dump discharge gates into two rail receival pits.
The coal is transferred to the stockpile which has a capacity of 2.3 million tonnes. Users are apportioned dedicated areas corresponding with their shareholding commitments. The amount and type of coal in the stockpile is determined by the mines.

Coal outbound from the terminal

The outloading of coal is carried out by reclaimers onto the outgoing conveying system. The coal is conveyed 3.85 kilometres by belt to the shiploader.

The offshore wharf is capable of accommodating two cape class vessels, and is designed to accommodate ships up to 200,000 dwt. Shiploader No.1 is rail mounted and travels along the wharf to service both berths. Shiploader No. 2 is currently under construction.

PORT OF GLADSTONE

There are two coal terminals in this multi use port, the R G Tanna Terminal and Barney Port Coal Terminal.

R G Tanna Coal Terminal

The R G Tanna Coal Terminal located several kilometres west of the city of Gladstone and the Port of Gladstone is owned and operated by the Gladstone Port Authority.

Coal inbound into the terminal

Coal is transported by diesel and electric locomotive hauled trains using bottom dump wagons which is unloaded at either of two unloading stations.

Elevated conveyors place the coal in stockpiles that are formed by large bulldozers. The stockyard provides a capacity of 3.3 m tonnes. The amount and type of coal in the stockpile is managed by the mine.

Coal outbound from the terminal

Each stockpile has a reclaim pit with reclamation by large bulldozers. Coal travels by a reclaim tunnel to a conveyor. Shiploading conveyor belts lead from the underground reclaim pits.

The jetty is 550m in length and leads to a 700m wharf with two shiploaders, which provides a berth to accommodate 2x220,000 dwt vessels.

Barney Point Coal Terminal

The coal terminal is located at Barney Point which is 2 km east of the Gladstone Central business district. The terminal is owned by BHP Mitsui Pty Ltd and operated by P & O Ports.

Coal inbound into the terminal

Coal trains utilise one bottom dump receival station. There is no balloon loop at Barney Point and wagons are pulled through the receival station by a traction motor. The train consist is broken into two parts due to the limited length of the rail spur in the terminal.

Two 0.5 km long rows each are located on either side of a mobile stacker. The total stockpile size using bulldozers together with the stacker is 400,000 tonnes.

Coal outbound from the terminal

Coal is reclaimed by front end loaders into a low steel storage bin on the shipping conveyor.

There is one shiploader located on a 204 m wharf, capable of handling ships up to 90,000 dwt.

PORT OF BRISBANE

The Coal Terminal is located at Fisherman Islands which is 20 km east of the Brisbane CBD. The terminal is owned and operated by Queensland Bulk Handling.

Coal inbound into the terminal

Diesel hauled locomotives using bottom dump wagons utilise a bottom dump receival station.

Elevated conveyors place the coal in stockpiles that are formed by large bulldozers.

Coal outbound from the terminal

Each stockpile has a reclaim pit with reclamation by large bulldozers. Shiploading conveyor belts lead from the underground reclaim pits to a single shiploader.

The berth which is shared with other users provides accommodation or 90,000dwt vessels.

APPENDIX VI

RAIL SYSTEM

MAIN COAL TRANSPORTATION SYSTEMS IN QUEENSLAND

The Goonyella system

This system connects a number of Bowen Basin mines to both the Dalrymple Bay Coal Terminal and Hay Point Services Terminal at the Port of Hay Point. The system is currently dedicated to electric traction and capable of carrying 104 tonne gross weight wagons at 80 kph. The furthest mine, Gregory, is located 316 km from the terminals. The system comprises approximately 715 track kilometres made up of the main artery much of which is duel track and other branches to the mines.

Two types of wagons are employed in the system; tippler or gondola wagons and bottom dump wagons. Gondola wagons which are equipped with special rotating couplings that allow the wagons to be unloaded by turning upside down in a dedicated unloader (a Tippler) serve mines with coal destined for the Hay Point Services Terminal which is equipped with two tippler unload stations.

Bottom dump wagons serve mines with coal destined for the Dalrymple Bay Coal Terminal which is equipped with two bottom dump facilities. The standard train consists of 4 electric locomotives hauling up to 136 wagons of 71, 80 and 90 gross tonnes carrying 7,500 tonnes. New consists, using 104 gross tonne wagons, are expected to have a standard train load of 9,600 tonnes

The track is duplicated from Hay Point to Broadlea west of Coppabella.

The length of track between mine and the Dalrymple Bay and Hay Point Services Coal Terminals at the Port of Hay Point is shown in Table 1.

TABLE 1: DISTANCES FROM MINES TO THE TERMINAL
AT THE PORT OF HAY POINT

MINE	DISTANCE TO TERMINAL AT THE PORT OF HAY POINT
Riverside	203km
North Goonyella	215km
Goonyella	198km
Blair Athol	280km
Peak Downs	192km
Saraji	213km
Norwich Park	256km
German Creek	277km
Oaky Creek	295km
Gregory	316km

The Blackwater system

The system links the mines in the vicinity of Blackwater with the R G Tanna and Barney Point coal terminals located at the Port of Gladstone. The system is 386 km long from the furthest mine and comprises approximately 725 track kilometres.

The main artery of the rail system consists of a dual track section of the North Coast Line between Gladstone and Rocklands just south of Rockhampton and extends west along the Central Line with coal carriage currently ceasing west of Blackwater. The track west of Rocklands is in the process of being duplicated. Branch lines feed into the Central Line in the vicinity of Blackwater. A rail connection exists between the Goonyella and Blackwater rail systems allowing a level of coal movements between these coal systems.

The system is dedicated to electric traction and bottom dump wagons are used throughout the Blackwater system. Maximum current line capacity is limited to 80 tonne wagons travelling at speeds of up to 80 kph. The standard train consists of 4 locomotives hauling 102x71 and 73 gross tonne wagons carrying up to 6200 tonnes. New consists, using 104 gross tonne wagons, are expected to have a standard train load of 9600 tonnes.

While most of the coal carried on the Blackwater system is exported overseas, there are substantial quantities of Blackwater and Curragh coal used by the Stanwell and Gladstone power stations and Queensland Alumina Ltd (QAL) at Gladstone.

The length of the track between mine site and the terminals at Gladstone is shown in Table 2.

TABLE 2: DISTANCES FROM MINES TO THE TERMINAL AT THE PORT OF GLADSTONE

MINE	DISTANCE TO TERMINAL AT THE PORT OF GLADSTONE
Oaky Creek	386 km
Gregory	369 km
Curragh	306 km
Yarrabee	286 km
Jellinbah East	286 km
Blackwater	316 km
South Blackwater	333 km
Ensham	352 km
Gordonstone	367 km

The Newlands system

The Newlands system covers a distance of 176 km and comprises 235 track km. The line was constructed specifically for the transport of coal from Newlands and Collinsville mines to the Abbot Point Coal Terminal for export.

The Newlands system line is not electrified and is suitable for diesel traction using bottom dump wagons. The track can carry axle loads up to 18.25 tonnes at a speed of 60 kph. The standard train load is 4,700 tonnes with a train consist comprising 4 diesel locomotives and 82x73 gross tone wagons.

While most of the coal transported on this line is destined for export there are some important domestic users. Major domestic users of coal from this system are located in Bowen, Townsville and Mount Isa Mines.

The Moura system

The Moura line is not electrified and comprises approximately 200 track kilometres. The track is single track with passing loops. The original track has come to the end of its design life and is currently being upgraded to accommodate 26 tonne axle loads at 80 kph.

The Moura system uses bottom dump wagons. The standard train comprises 3 diesel locomotives hauling 61x71 gross tonne wagons carrying 3200 tonnes.

The length of the track between minesite and the terminals at Gladstone is 179 km for Moura mine and 130 km for Boundary Hill/Callide.

There is a proposal to rebuild the line from Moura south to Theodore to handle the proposed output from proposed coal mines in the area.

Coal carried on the Moura system is destined for export or domestic consumption in the Gladstone power station.

The West Moreton system

This system links the mines in the West Moreton region with the Queensland Bulk Handling terminal at Fisherman Islands at the Port of Brisbane. In addition, coal from the west of Toowoomba destined for the Swanbank powerstation and export also uses this line.

For much of the route this system utilises track also used by suburban passenger trains and other freight services.

The standard train consists of 2 diesel locomotives hauling 39x63 gross tonne wagons carrying 1800 tonnes.